4 82

SERVICE MANUAL

ST-50/ST-50L

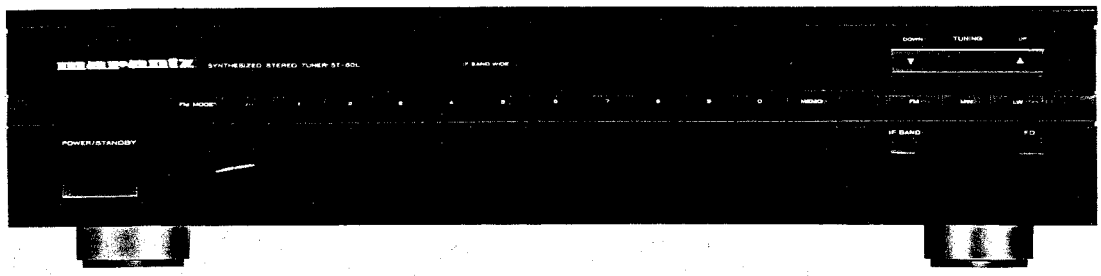
4822 725 50894

marantz®

model ST-50/ST-50L

Synthesized Stereo Tuner

MODEL ST-50/ST-50L SYNTHESIZED STEREO TUNER



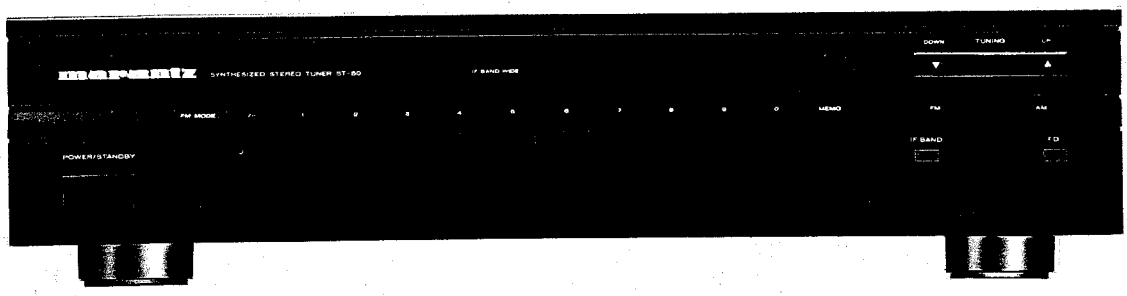


TABLE OF CONTENTS

SECTION		PAGE
1.	BLOCK DIAGRAM	4
2.	SCHEMATIC DIAGRAM (ST-50)	7
3.	PARTS LOCATIONS (PATTERN SIDE)	10
4.	SCHEMATIC DIAGRAM (ST-50L)	13
5.	PARTS LOCATIONS (PATTERN SIDE)	16
6.	EXPLODED VIEW AND PARTS LIST	24
7.	SERVICE PROGRAM	26
8.	TUNER ALIGNMENT	27
9.	ALIGNMENT POINTS AND TEST POINTS	29
10.	TUNER MICROPROCESSOR SPECIFICATIONS	30
11.	VOLTAGE CONVERSION	34
12.	ELECTRICAL PARTS LIST	35

MODEL ST-50/ST-50L TECHNICAL SPECIFICATIONS (DIN)

FM Stage 87.5~108 MHz

Sensitivity	
DIN mono (s/n 26 dB 75 Ohms)	0.7 μV
DIN stereo (s/n 46 dB 75 Ohms)	20 μV
Selectivity adjacent channel 98 MHz	
Wide IF	40 dB
Narrow IF	75 dB
Tuner output (1 kHz 75 kHz Deviation)	940 mV
Signal to noise ratio	
S/N DIN weighted mono	86 dB
S/N DIN weighted stereo	78 dB
Total harmonic distortion mono	
Wide IF	0.05%
Narrow IF	0.15%
Total harmonic distortion stereo	
Wide IF	0.08%
Narrow IF	0.3%
Accuracy of frequency response	
across 30 Hz~15 kHz bandwidth	+0.5/—1.5 dB
Stereo separation	
Wide IF	55 dB
Narrow IF	50 dB

MW Stage (531~1602 kHz)

Sensitivity (s/n 20 dB 30% mod. 1 MHz)	350 μV
Selectivity 1 MHz 9 kHz	40 dB
Signal to noise ratio at 1 MHz	54 dB

LW Stage (152~282 kHz)

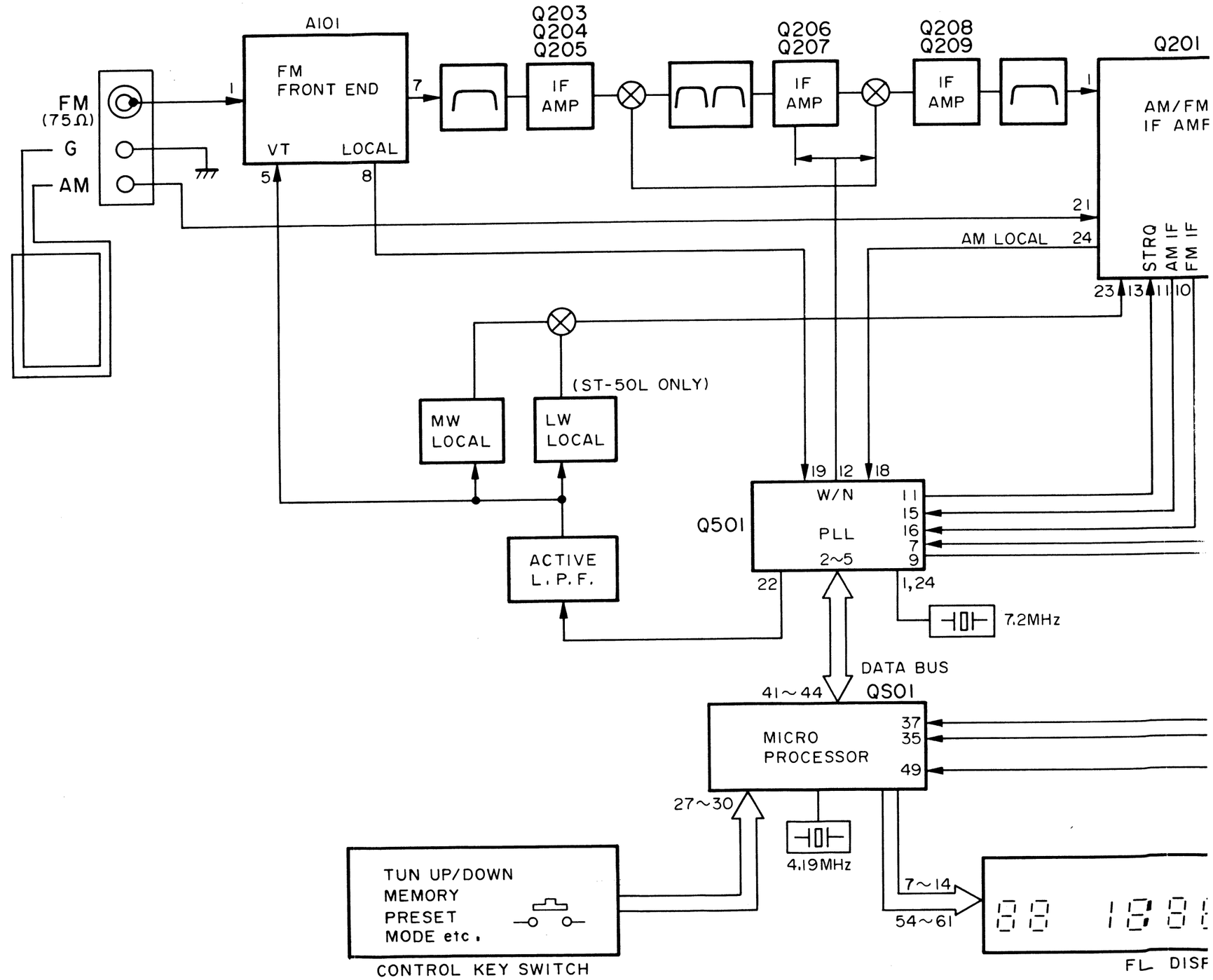
Sensitivity (s/n 20 dB 30% mod. 250 kHz)	800 μV
Signal to noise ratio at 250 kHz	50 dB

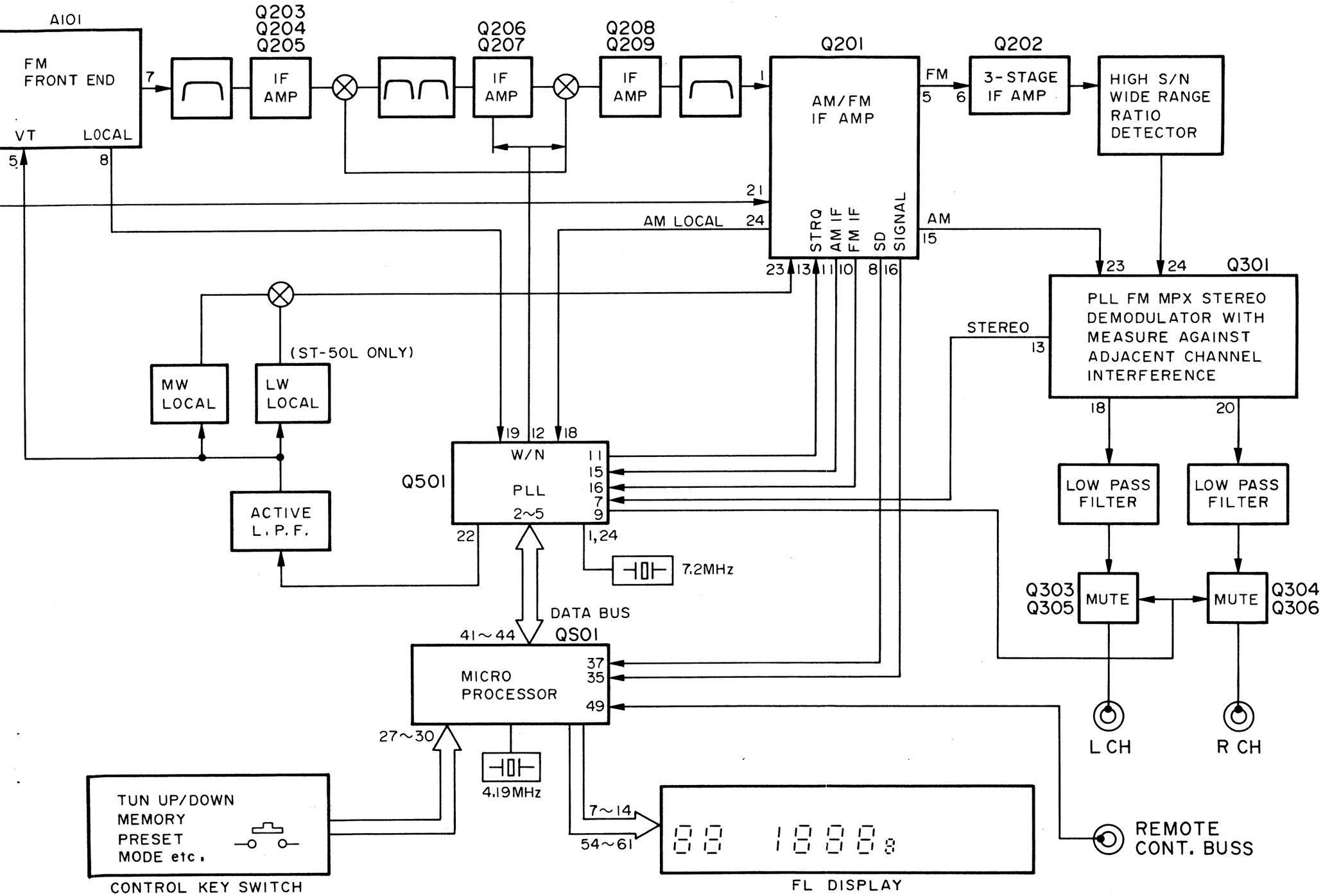
General

Power Requirements	
N and W/T versions	220/240V AC, 50/60 Hz
E version (4 Voltages)	110/120/220/240V AC, 50/60 Hz
Dimensions	
Panel Width	420 mm
Panel Height	86 mm
Depth	334 mm
Weight	
Unit Alone	4.5 kg

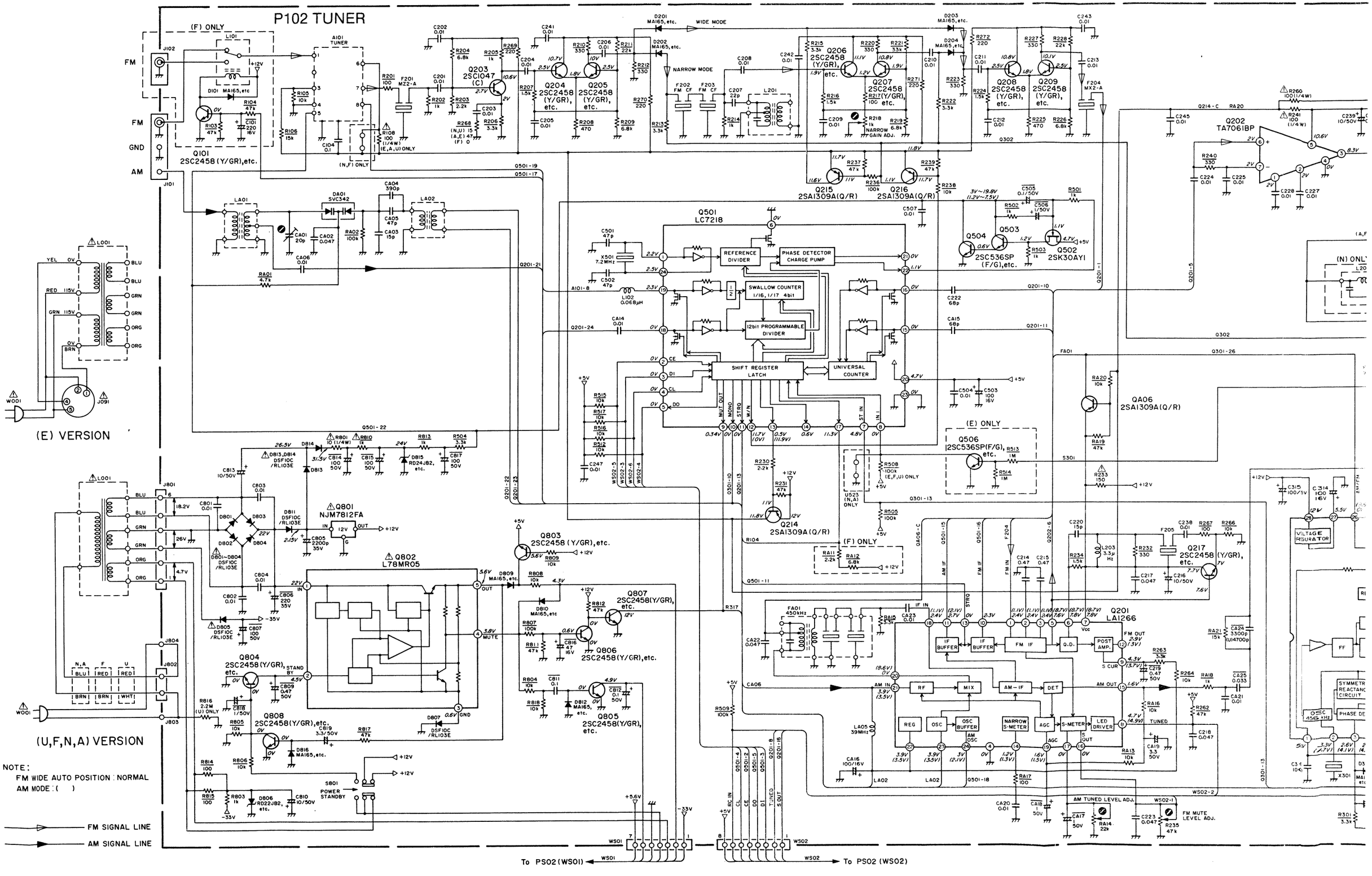
Specifications subject to change without prior notice.

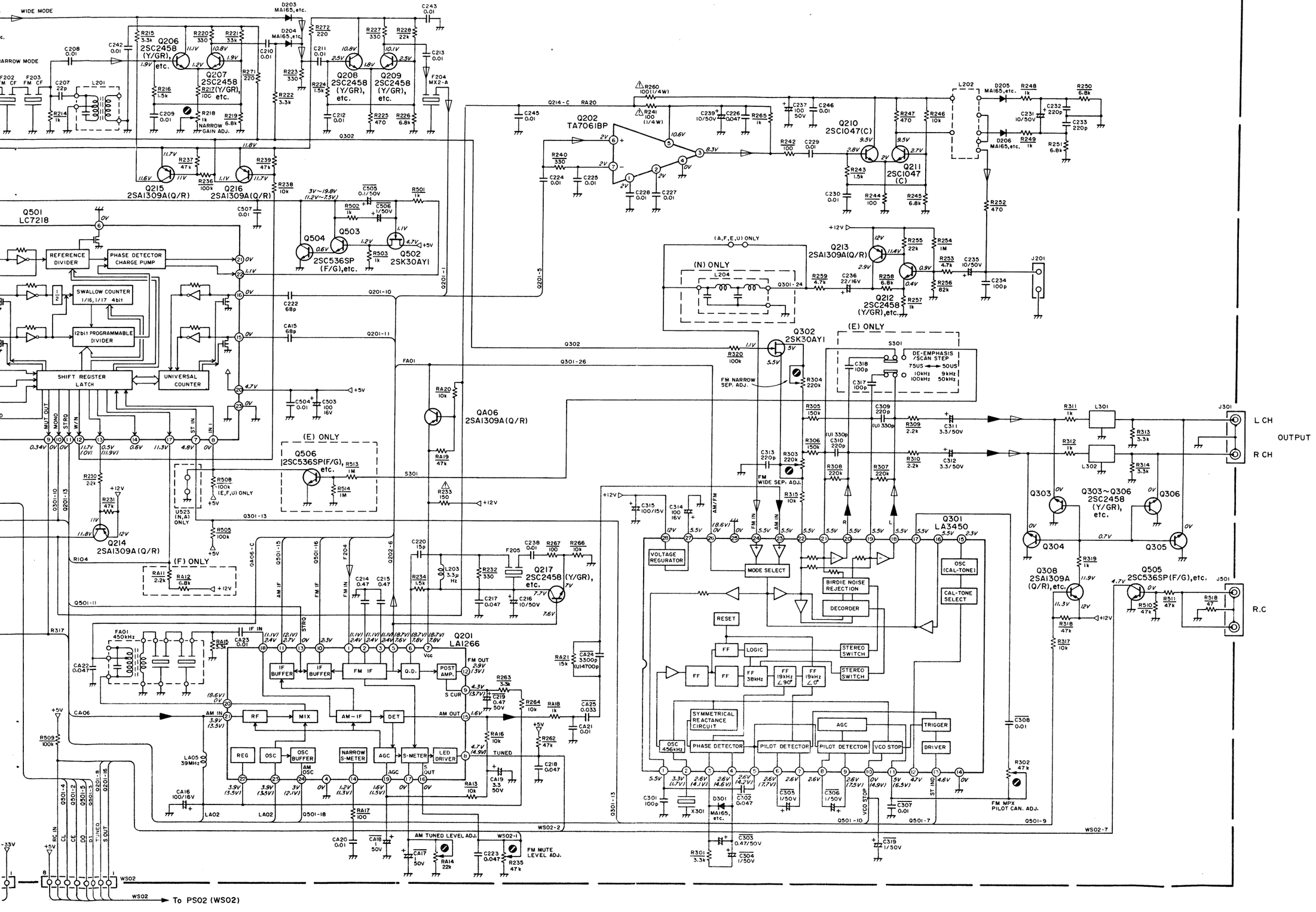
1. BLOCK DIAGRAM

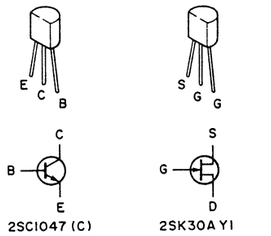



A101
FM
FRONT END
VT
LOCAL
5
8
7
Q203
Q204
Q205
IF
AMP
Q206
Q207
IF
AMP
Q208
Q209
IF
AMP
1
Q201
AM/FM
IF AMP
21
AM LOCAL
24
STRQ
AM IF
FM IF
SD
SIGNAL
23
13
11
10
8
16
FM
5
6
Q202
3-STAGE
IF AMP
HIGH S/N
WIDE RANGE
RATIO
DETECTOR
AM
15
23
24
Q301
PLL FM MPX STEREO
DEMODULATOR WITH
MEASURE AGAINST
ADJACENT CHANNEL
INTERFERENCE
STEREO
13
18
20
LOW PASS
FILTER
LOW PASS
FILTER
Q303
Q305
MUTE
MUTE
Q304
Q306
L CH
R CH
(ST-50L ONLY)
MW
LOCAL
LW
LOCAL
ACTIVE
L.P.F.
19
12
18
W/N
Q501
PLL
2~5
11
15
16
7
9
22
1,24
7.2MHz
DATA BUS
41~44
QS01
MICRO
PROCESSOR
37
35
49
27~30
4.19MHz
7~14
54~61
REMOTE
CONT. BUSS
TUN UP/DOWN
MEMORY
PRESET
MODE etc.
CONTROL KEY SWITCH
FL DISPLAY

2. SCHEMATIC DIAGRAM (ST-50) FT50

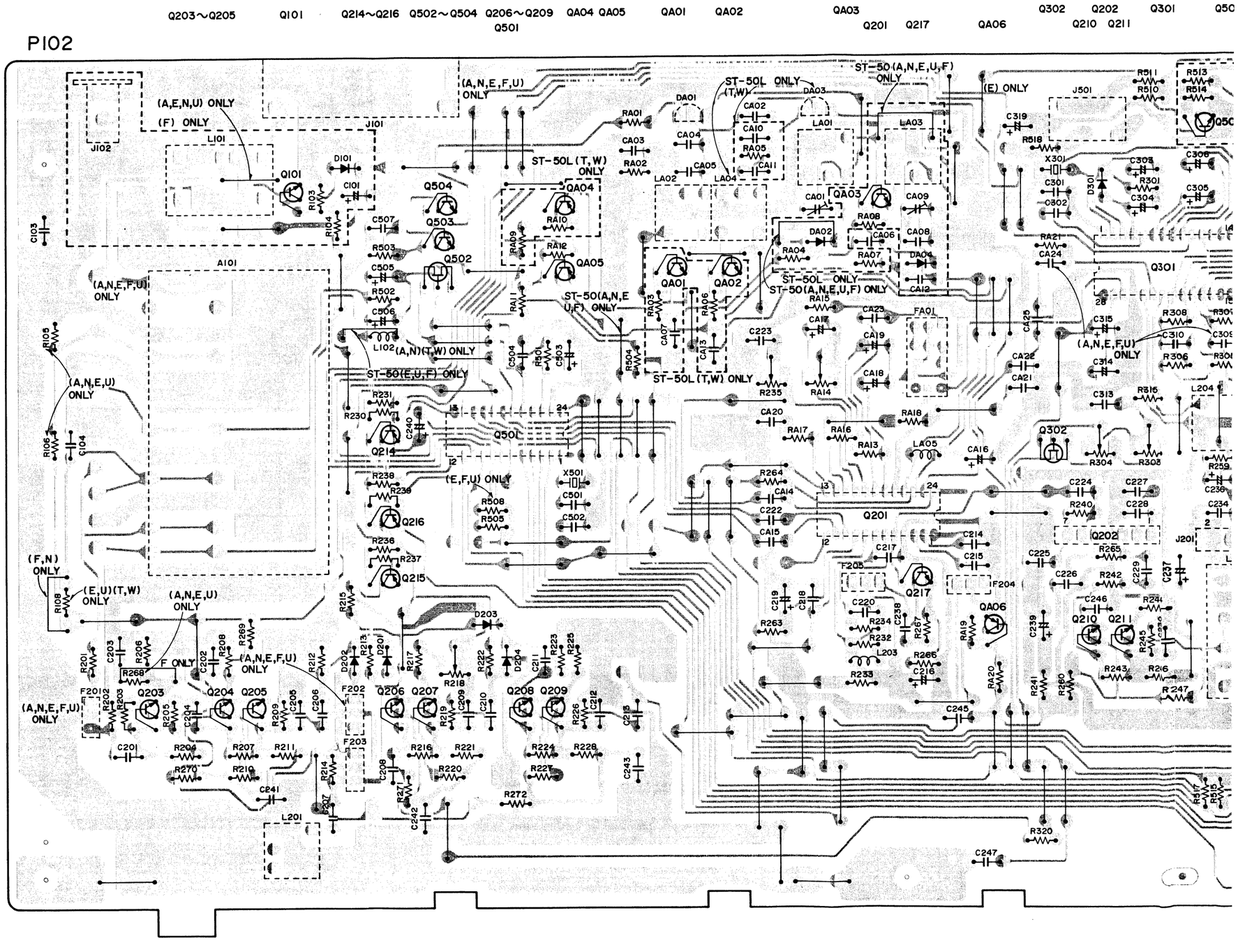



WIDE MODE
NARROW MODE
Q206 2SC2458 (Y/GR), etc.
Q207 2SC2458 (Y/GR), etc.
Q208 2SC2458 (Y/GR), etc.
Q209 2SC2458 (Y/GR), etc.
NARROW GAIN ADJ.
Q215 2SA1309A(Q/R)
Q216 2SA1309A(Q/R)
Q501 LC7218
REFERENCE DIVIDER
PHASE DETECTOR CHARGE PUMP
SWALLOW COUNTER 1/16, 1/17 4bit
12bit PROGRAMMABLE DIVIDER
SHIFT REGISTER LATCH
UNIVERSAL COUNTER
Q504
Q503
Q502 2SK30AYI
2SC536SP (F/G), etc.
Q506 2SC536SP(F/G), etc.
(E) ONLY
(E,F,U) ONLY
(F) ONLY
(N,A) ONLY
Q214 2SA1309A(Q/R)
Q202 TA7061BP
Q210 2SC1047(C)
Q211 2SC1047 (C)
Q212 2SC2458 (Y/GR), etc.
Q213 2SA1309A(Q/R)
(A,F,E,U) ONLY
(N) ONLY
Q302 2SK30AYI
FM NARROW SEP. ADJ.
FM WIDE SEP. ADJ.
DE-EMPHASIS /SCAN STEP
75US ⟷ 50US
10kHz 100kHz ⟷ 9kHz 50kHz
QA06 2SA1309A(Q/R)
Q301 LA3450
VOLTAGE REGURATOR
MODE SELECT
BIRDIE NOISE REJECTION
DECORDER
OSC (CAL-TONE)
CAL-TONE SELECT
RESET
FF
LOGIC
STEREO SWITCH
SYMMETRICAL REACTANCE CIRCUIT
AGC
TRIGGER
DRIVER
PHASE DETECTOR
PILOT DETECTOR
VCO STOP
Q303~Q306 2SC2458 (Y/GR), etc.
Q308 2SA1309A (Q/R), etc.
Q505 2SC536SP(F/G), etc.
L CH
OUTPUT
R CH
R.C
Q201 LA1266
IF BUFFER
FM IF
Q.D.
POST AMP.
RF
MIX
AM-IF
DET
REG
OSC
OSC BUFFER
NARROW S-METER
AGC
S-METER
LED DRIVER
AM TUNED LEVEL ADJ.
FM MUTE LEVEL ADJ.
FM MPX PILOT CAN. ADJ.
To PS02 (WS02)



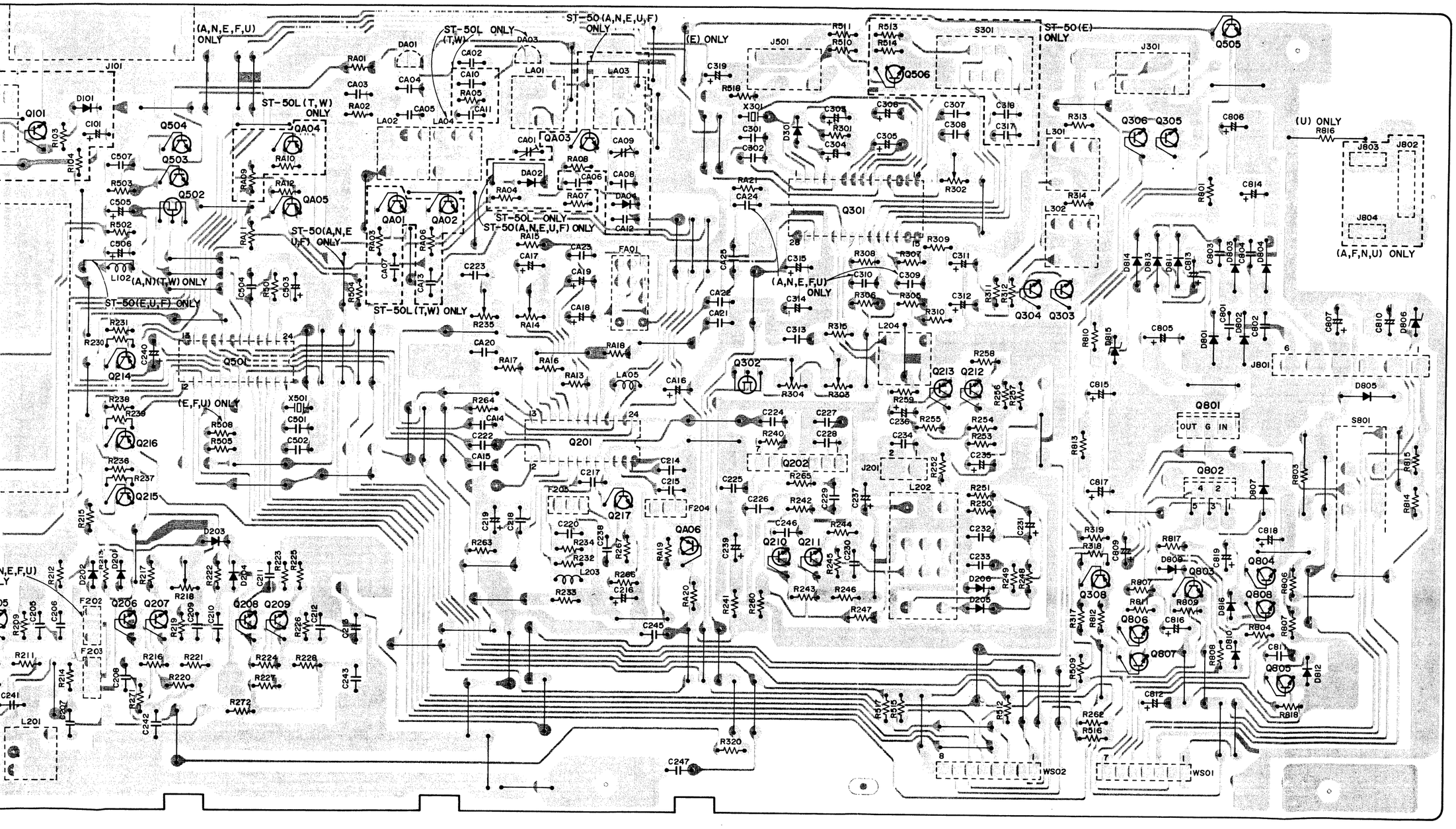
3. PARTS LOCATIONS (PATTERN SIDE)

P102

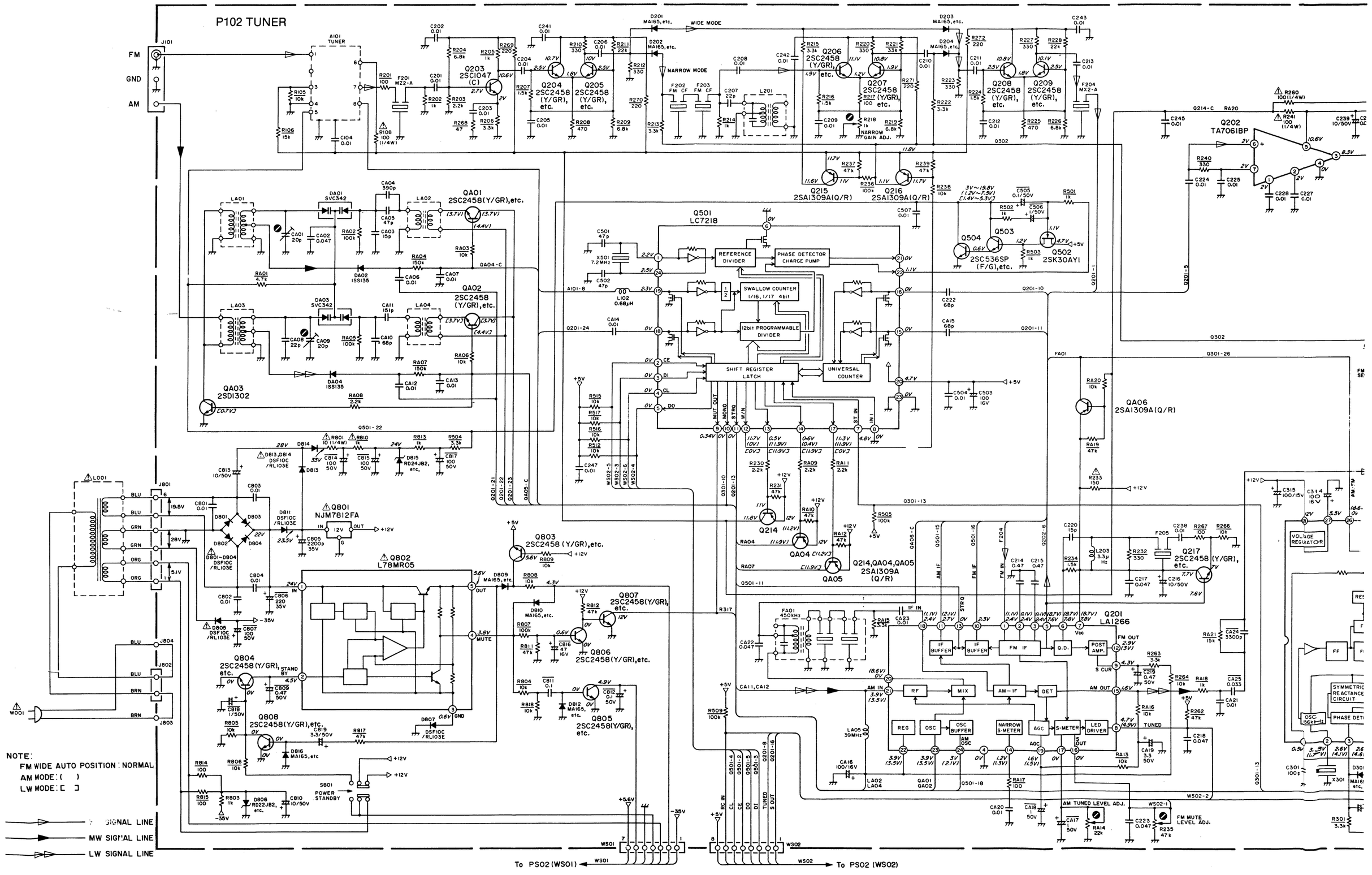


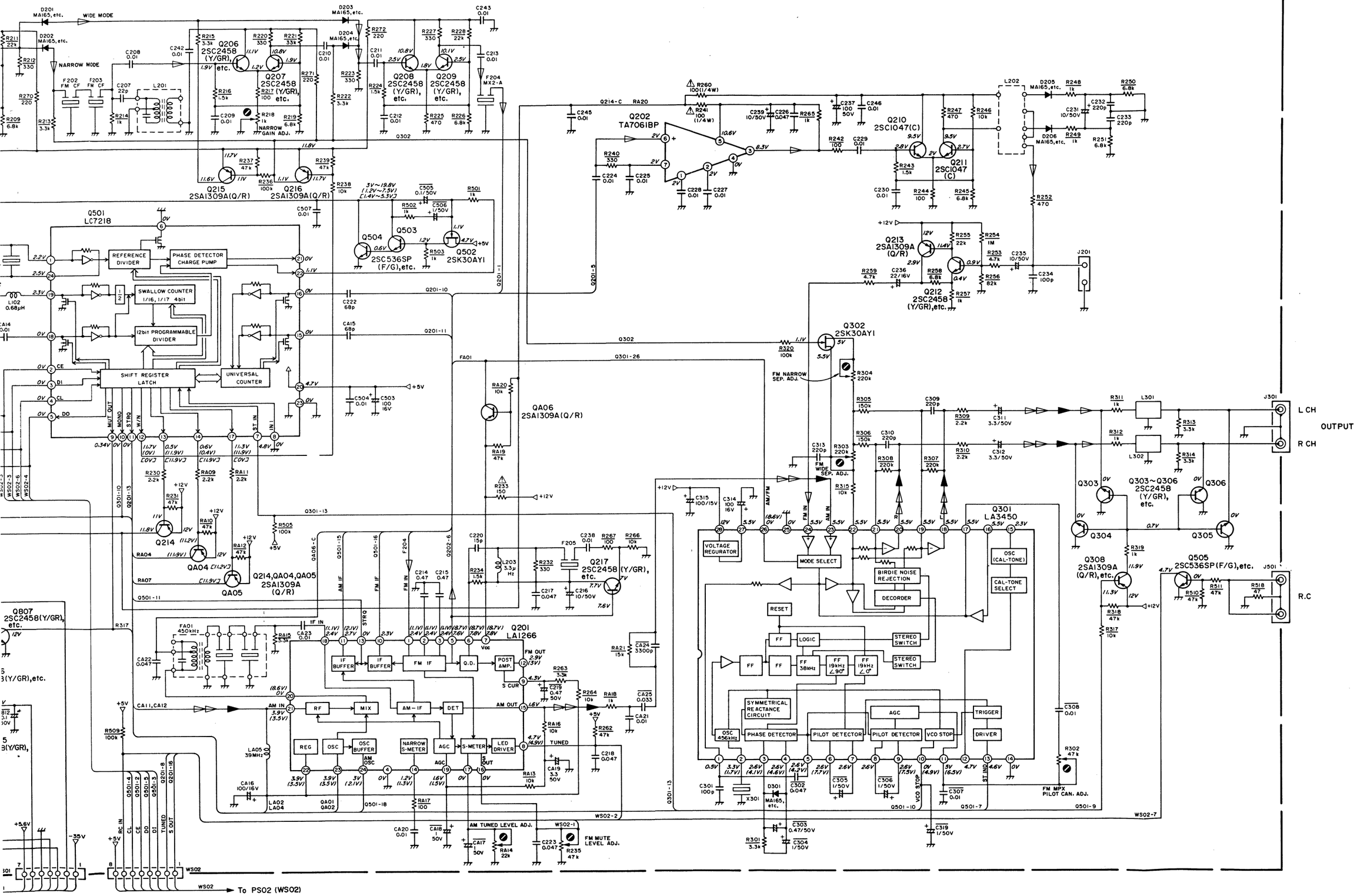
TERN SIDE)

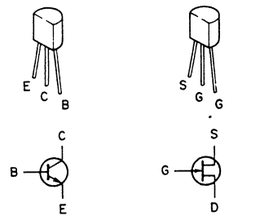
Q101 Q214~Q216 Q502~Q504 Q206~Q209 Q501 QA04 QA05 QA01 QA02 QA03 Q201 Q217 QA06 Q302 Q210 Q211 Q202 Q301 Q506 Q213 Q212 Q304 Q303 Q308 Q306 Q305 Q801~Q807 Q505

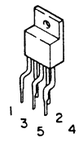


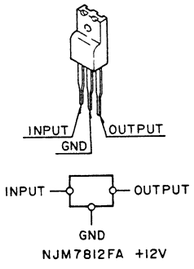
4. SCHEMATIC DIAGRAM (ST-50L)

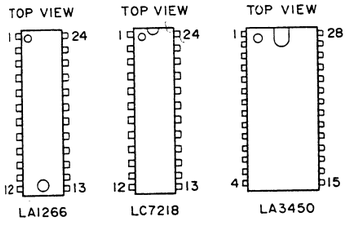


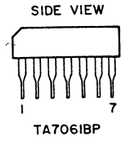

WIDE MODE
NARROW MODE
Q501
LC7218
REFERENCE DIVIDER
PHASE DETECTOR CHARGE PUMP
SWALLOW COUNTER
1/16, 1/17 4bit
12bit PROGRAMMABLE DIVIDER
SHIFT REGISTER LATCH
UNIVERSAL COUNTER
Q214, QA04, QA05
2SA1309A (Q/R)
Q215
2SA1309A(Q/R)
Q216
2SA1309A(Q/R)
Q206
2SC2458 (Y/GR), etc.
Q207
2SC2458 (Y/GR), 100 etc.
Q208
2SC2458 (Y/GR), etc.
Q209
2SC2458 (Y/GR), etc.
Q202
TA7061BP
Q210
2SC1047(C)
Q211
2SC1047 (C)
Q212
2SC2458 (Y/GR), etc.
Q213
2SA1309A (Q/R)
Q504
2SC536SP (F/G), etc.
Q503
Q502
2SK30AYI
QA06
2SA1309A(Q/R)
Q302
2SK30AYI
Q217
2SC2458 (Y/GR), etc.
Q201
LA1266
IF BUFFER
IF BUFFER
FM IF
Q.D.
POST AMP.
RF
MIX
AM-IF
DET
REG
OSC
OSC BUFFER
NARROW S-METER
AGC
S-METER
LED DRIVER
Q301
LA3450
VOLTAGE REGURATOR
MODE SELECT
BIRDIE NOISE REJECTION
DECORDER
OSC (CAL-TONE)
CAL-TONE SELECT
RESET
FF
LOGIC
STEREO SWITCH
SYMMETRICAL REACTANCE CIRCUIT
PHASE DETECTOR
PILOT DETECTOR
PILOT DETECTOR
VCO STOP
AGC
TRIGGER
DRIVER
Q303~Q306
2SC2458 (Y/GR), etc.
Q308
2SA1309A (Q/R), etc.
Q505
2SC536SP(F/G), etc.
L CH
R CH
OUTPUT
R.C
FM NARROW SEP. ADJ.
FM WIDE SEP. ADJ.
AM TUNED LEVEL ADJ.
FM MUTE LEVEL ADJ.
FM MPX PILOT CAN. ADJ.
NARROW GAIN ADJ.
To PS02 (WS02)



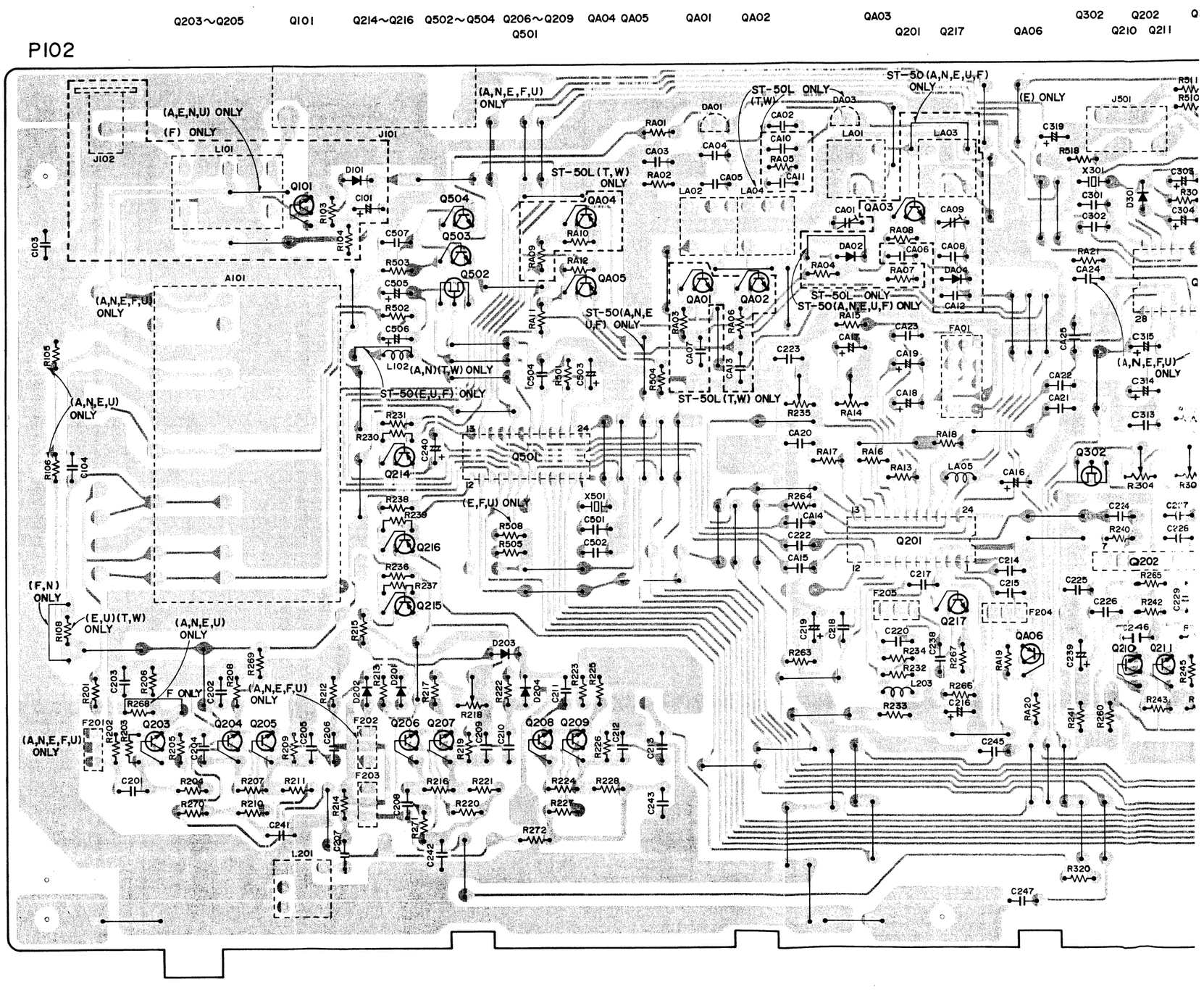






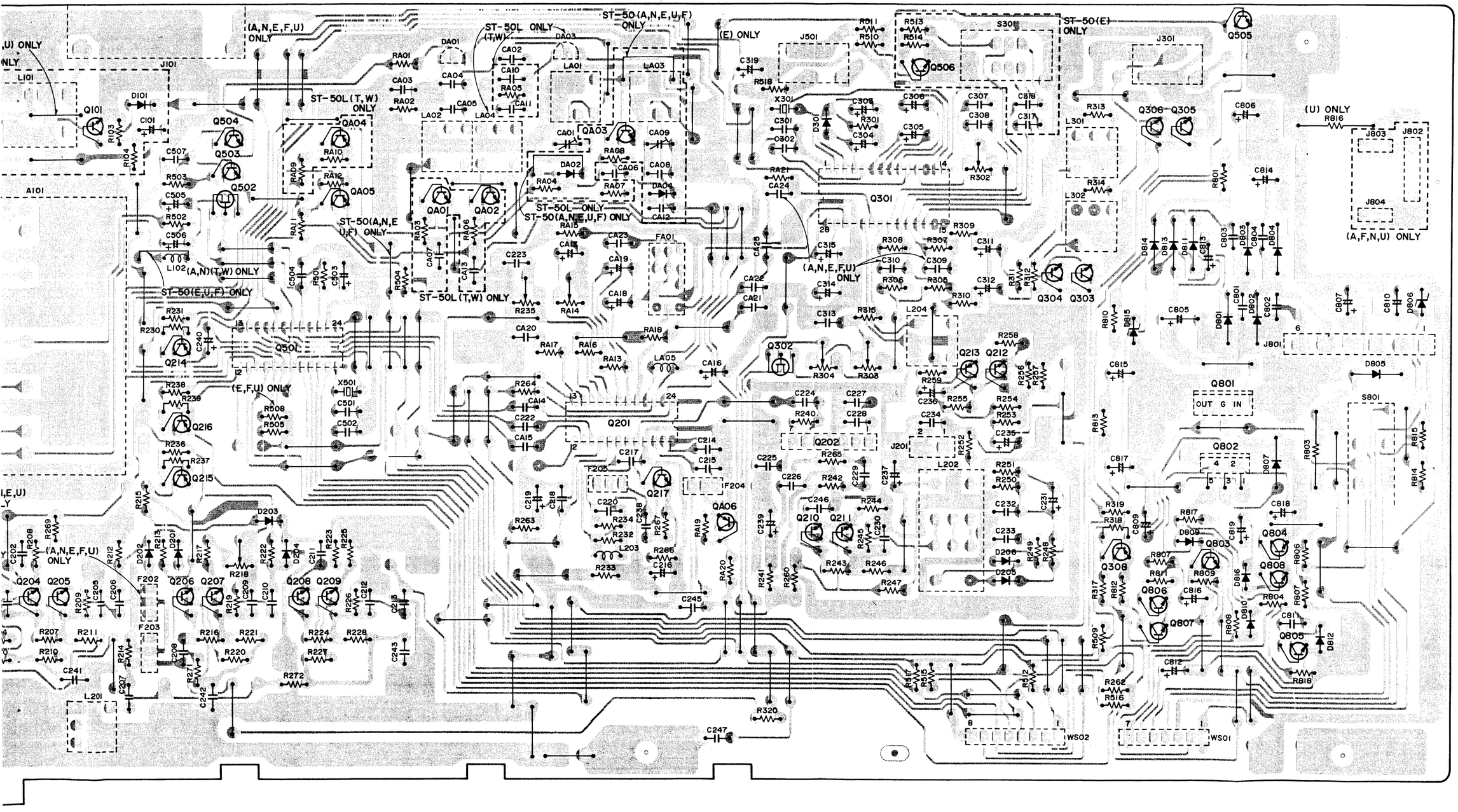


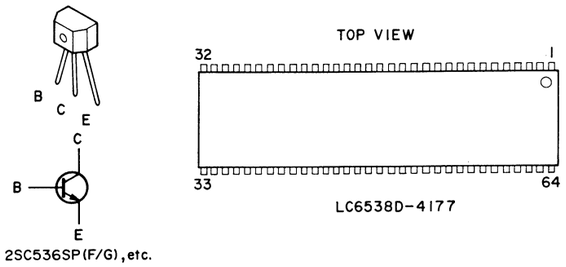
5. PARTS LOCATIONS (PATTERN SIDE)



S (PATTERN SIDE)

3~Q205 Q101 Q214~Q216 Q502~Q504 Q206~Q209 Q501 QA04 QA05 QA01 QA02 QA03 Q201 Q217 QA06 Q302 Q210 Q211 Q202 Q301 Q506 Q213 Q212 Q304 Q303 Q308 Q306 Q305 Q801~Q807 Q505





PS02

VSO1

PRESET MEMORY STEREO ANT A B TUNED AUTO LW MW FM AM MHz kHz 0 2 4 6 8 10

GS03 100p x 8

GS02 100p x 8

F2

F1

-32V

QS01
LC6538D-4177

KEY RETURN DATA

I/O PORT A

64 x 4 RAM 2 128 x 4

FLT DISPLAY CONTROLLER AND DRIVER 8 SEGMENT 4 SEGMENT/DIGIT 12 DIGIT

ANALOGUE INPUT PORT B (COMPARATOR)

I/O PORT E

I/O PORT C

I/O PORT D

I/O PORT E

8 BIT SERIAL I/O PORT

RAM I 256 x 4

F WR

DP

P.C.

ROM 8192 x 8

16 LEVEL STACK

INC

INSTRUCTION REGISTER. DECODER

SYSTEM BUS

I/O BUFFER

E AC STS ZF CF ZSF CSF ALU

INTERRUPT CONTROLLER

I/O BUS

I/O PORT G

8 BIT SERIAL I/O PORT

H SYNC COUNTER

I/O PORT H

6 BIT PWM DAC/6 BIT PROGRAMABLE PRESCALER

8 BIT(14 BIT) PWM DAC/8 BIT INTERVAL TIMER

PRESCALER

8 BIT TIMER

STAND BY CONTROLLER

14 BIT TIMER BASE TIMER/COUNTER (WATCH DOG TIMER)

SYSTEM CLOCK CONTROLLER

4.19 MHz OSC

32.768 kHz OSC

XS01 4.19MHz

CS03 100 16V

CS02 0.01

CS01 0.047 5.5V

RS01 470

DS01 MA165,etc.

To PI02 (WS02)

SIG IN QS01-35
SD IN QS01-37
DI QS01-41
DO QS01-42
CE QS01-43
CL QS01-44
RC IN QS01-49

GS01 100k x 4

2 SS04 6 SS08 F(10) 0 SS12 (AM) LW SS16 F(FM ANT) FD SS20
1 SS03 5 SS07 9 SS11 ST-50L ONLY (MW) SS15 IF BAND SS19
F(+10) SS02 4 SS06 8 SS10 FM SS14 TUN UP SS18
MODE SS01 3 SS05 7 SS09 ME SS13 TUN DOWN SS17

DS04 QS01-3
DS03 QS01-2
DS02 QS01-1
DS06 QS01-64
DS07 QS01-63

DS02~DS04, DS06, DS07 MA165, etc.

(A,N,E,U) ONLY RS07 10k

DS09 MA165, etc. (A,N,E,U) ONLY

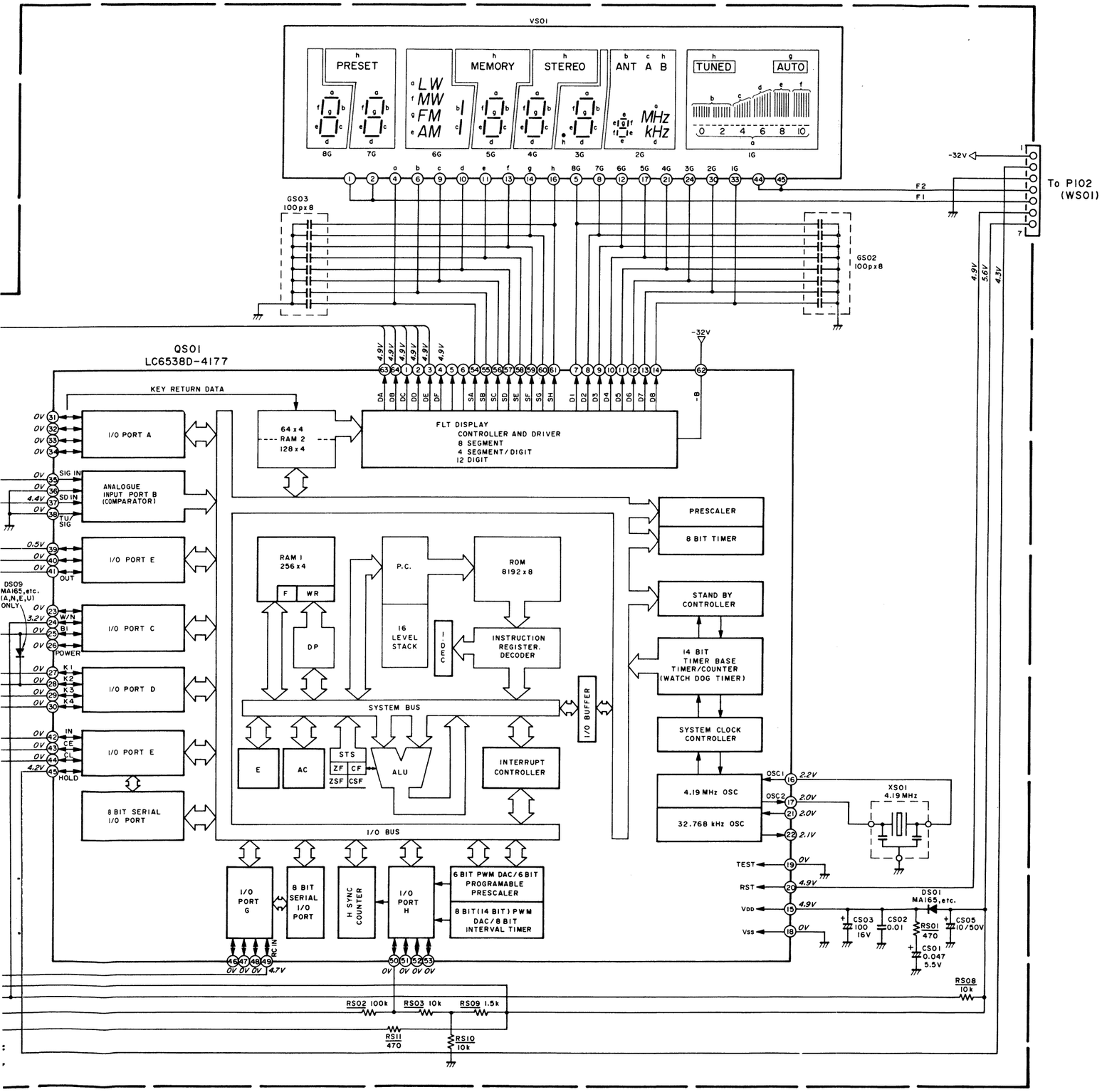
QS02 2SC536SP(F/G), etc.

DS08 LT3088

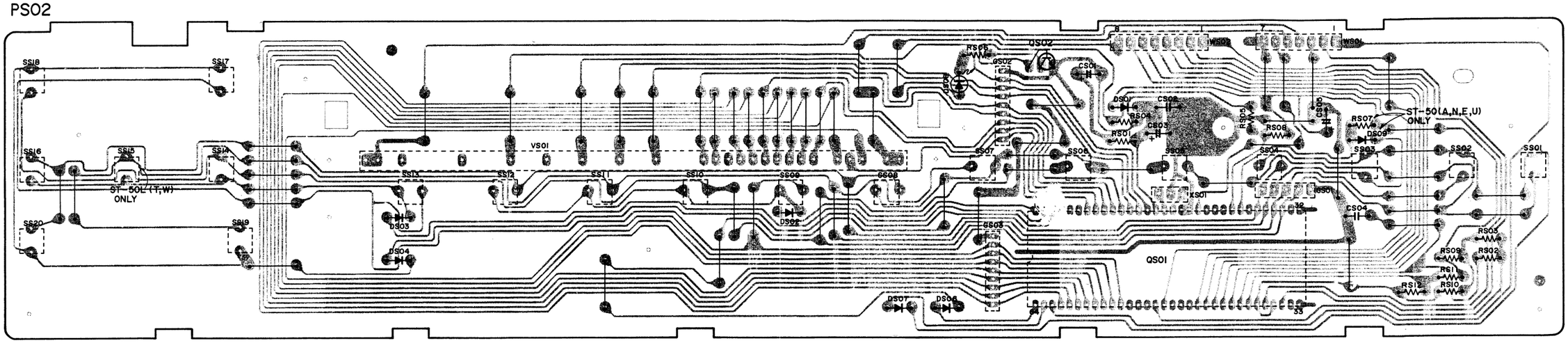
RS06 150 RS05 10k RS04 47k

RS12 470 CS04 0.01

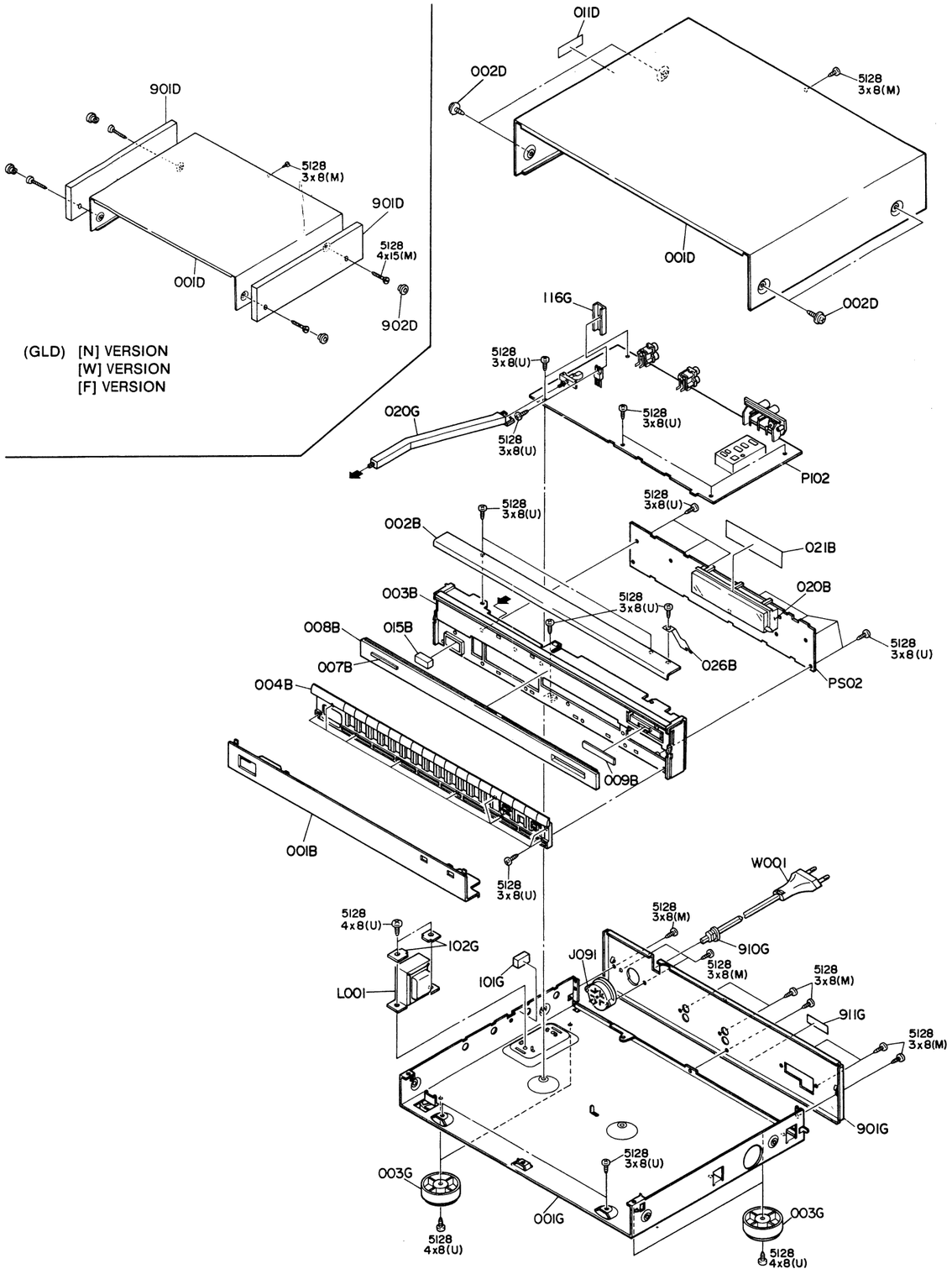
RS02 100k RS03 10k RS09 1.5k RS11 470 RS10 10k


VS01
PRESET
MEMORY
STEREO
ANT A B
TUNED
AUTO
LW
MW
FM
AM
MHz
kHz
0 2 4 6 8 10
8G 7G 6G 5G 4G 3G 2G 1G
GS03
100px8
GS02
100px8
F2
F1
-32V
To P102
(WS01)
4.9V
5.6V
4.3V
QS01
LC6538D-4177
KEY RETURN DATA
-32V
-8
I/O PORT A
64x4
RAM 2
128x4
FLT DISPLAY
CONTROLLER AND DRIVER
8 SEGMENT
4 SEGMENT/DIGIT
12 DIGIT
SIG IN
SD IN
TU SIG
ANALOGUE
INPUT PORT B
(COMPARATOR)
PRESCALER
8 BIT TIMER
I/O PORT E
OUT
RAM 1
256x4
F
WR
P.C.
ROM
8192x8
16
LEVEL
STACK
I.DEC
INSTRUCTION
REGISTER.
DECODER
DP
STAND BY
CONTROLLER
14 BIT
TIMER BASE
TIMER/COUNTER
(WATCH DOG TIMER)
I/O PORT C
W/N
BI
POWER
I/O PORT D
SYSTEM BUS
I/O BUFFER
SYSTEM CLOCK
CONTROLLER
IN
CE
CL
HOLD
I/O PORT E
E
AC
STS
ZF
CF
ZSF
CSF
ALU
INTERRUPT
CONTROLLER
4.19MHz OSC
32.768 kHz OSC
OSC1
OSC2
XS01
4.19MHz
8 BIT SERIAL
I/O PORT
I/O BUS
I/O
PORT
G
8 BIT
SERIAL
I/O
PORT
H SYNC
COUNTER
I/O
PORT
H
6 BIT PWM DAC/6 BIT
PROGRAMABLE
PRESCALER
8 BIT(14 BIT) PWM
DAC/8 BIT
INTERVAL TIMER
TEST
RST
VDD
VSS
DS01
MA165,etc.
CS03
100
16V
CS02
0.01
RS01
470
CS05
10/50V
CS01
0.047
5.5V
RS08
10k
RS02 100k
RS03 10k
RS09 1.5k
RS11
470
RS10
10k
DS09
MA165,etc.
(A,N,E,U)
ONLY

PS02


QS02
QS01
SS18
SS17
SS16
SS15
SS14
ST-50L(-T,W)
ONLY
SS20
SS19
VS01
SS13
SS12
SS11
SS10
SS09
SS08
DS03
DS02
DS04
SS07
SS06
SS05
RS05
QS02
CS01
DS01
CS02
RS04
CS03
RS01
SS04
SS03
SS02
SS01
XS01
CS04
RS07
DS05
RS08
RS06
ST-50(A,N,E,U)
ONLY
RS03
RS09
RS02
RG1
RS10
RS11
DS07
DS06
QS01

6. EXPLODED VIEW AND PARTS LIST



REF. DESIG.	PART NO.	DESCRIPTION
001B	4822 426 51394	Front Panel (BLK)
001B	4822 426 51384	Front Panel (GLD) [E, N, W]
002B	4822 426 51402	Front Panel (BLK) [E, N, T, W]
	4822 426 51385	Front Panel (GLD) [E, N, W]
	4822 426 51395	Front Panel (BLK) [U]
003B	4822 464 70561	Chassis, Front (BLK)
		Chassis, Front (GLD) [N, E, W]
004B	4822 410 60548	Button Assy, Hinge (BLK)[A, E, N]
	4822 410 60344	Button Assy, Hinge (GLD) [N, E]
	4822 410 60345	Button Assy, Hinge (BLK) [T, W]
	4822 410 60346	Button Assy, Hinge (GLD) [W]
	4822 410 60451	Button Assy, Hinge (GLD) [U]
007B	4822 459 10943	Badge, (BLK)
		Badge, (GLD) [N, E, W]
	4822 454 40107	Badge [U]
008B	4822 450 61515	Window (ST-50)
	4822 450 61456	Window (ST 50L)
	4822 450 61486	Window (FT50)
009B	4822 410 60533	Button, Tuning (BLK)
	4822 410 60359	Button, Tuning (GLD) [N, E, W]
	4822 410 60452	Button (BLK) [U]
015B	4822 410 60194	Button, Power (BLK)
	4822 410 60358	Button, Power (GLD) [N, E, W]
020B		Holder, FL
021B		Sticker, FL
026B	4822 492 70406	Leaf Spring
901D	4822 426 30143	Side Panel, (GLD) [N,W]
902D	4822 444 60607	CAP, (GLD) [N,W]
003G	4822 462 41477	Leg (ST-50/50L)
	4822 462 41402	Leg (FT50)
020G		Link, Power
910G	4822 532 60948	Bushing, AC Cord
⚠ L001	4822 146 21503	Power Transformer [A, N, T, W]
	4822 146 21458	Power Transformer [E]
	4822 146 21486	Power Transformer [U]
⚠ J091	4822 272 10235	Voltage Selector [E]
001T	4822 736 20523	User Manual (ST-50/ST-50L)
	4822 736 20477	User Manual (FT50)

U=FT50 only

7. SERVICE PROGRAM

1. T.R POINT ME (tracking point memory) mode.
   From power OFF (backup mode), when the power switch is pressed ON while pressing the FM or AM (MW) band key simultaneously, the T.R POINT ME mode is called.

		P1	P2	P3	P4	P5	P6	P7	P8	P9
FM	EUROPE	90MHz	98MHz	106MHz						
	USA	90MHz	98MHz	106MHz						
	JAPAN	78MHz	83MHz	88MHz						
AM	9kHz without LW				603kHz	999kHz	1404kHz	—	—	—
	9kHz with LW				603kHz	999kHz	1404kHz	173kHz	209kHz	272kHz
	10kHz				600kHz	1000kHz	1400kHz	—	—	—

		P10	P11	P12 ~ P30
FM	EUROPE			—
	USA			
	JAPAN			
AM	9kHz without LW	—	—	
	9kHz with LW	152kHz	531kHz	
	10kHz	—	—	

—: Low end frequency of the FM or AM (MW) band.

2. Segment check mode
   1) In the above situation, further press the FM or AM (MW) band key simultaneously.
   2) The muting signal is output and the service program is started. During the execution of the service program, muting remains ON.
   3) The fluorescent display all goes out once, lighting is performed from segments D1-a to D8-h sequentially one after another at a rate of 0.3 second/segment. (A segment once lit does not go out as it stands.)
   4) When all the segments light, the segment check mode is terminated with their lighting for 3 seconds as they are. (The band and frequency engaged right before the segment chec mode are restored.)
      During the lighting for 3 seconds, when the MEMORY key is pressed, all the segments continue lighting as they are.
      When the MEMORY key is pressed once again, all the segments flicker for 3 seconds (at 1 Hz), with which the segment check mode is then terminated.
   5) During the execution of the segment check mode, any other key than the MEMORY key is not accepted.
   6) In the state of 3), when the MEMORY key is pressed, the state that all the segments light is entered. Namely, by the pressure of the MEMORY key, it is possible to skip over the process that all segments light one after another in sequence.

* During the execution of the service program, when the power is turned once OFF and then ON, the service program is canceled.

8. TUNER ALIGNMENT PROCEDURES

Set to T.R point ME mode of the service program.
(P2) to (P6) in the Digital Readout Frequency Setting column shows preset numbers for the above mode.
Before alignment, connect a dummy resistor of 47 kohms to the tuner output terminal.

8-1. FM Alignment Procedures

(Function switch at "FM" position and MODE switch at "MONAURAL" position)

- **FM RF Alignment** (IF BAND switch at "WIDE" position)

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Digital Readout Frequency Setting	Adjust
1	FM signal generator to FM antenna terminal. Adjust the RF signal output so that slight noise occurs at the upper and lower sides of the output waveform.	98.0 MHz	AC VTVM to L- or R-channel output (J301)	98.0 MHz (P2)	Front end IFT for maximum output and minimum distortion.
2	FM signal generator 500 μV output to FM antenna terminal (75-ohm).	98.0 MHz	"0" center meter or DC current meter (100 μA range) to J201.	98.0 MHz (P2)	L202 (primary winding) core so that the meter points to its center or reads "0".
3			Distortion meter to L- or R-channel output (J301)		L202 (secondary winding) core for minimum distortion.

- **FM IF Alignment**

(Function switch at "FM" position and MODE switch at "AUTO STEREO" position)

1) IF BAND switch at "WIDE" position

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Digital Readout Frequency Setting	Adjust
1	FM signal generator 500 μV output modulated by MPX signal generator to FM antenna terminal (75-ohm). Modulation level: IHF 67.5 kHz +9 % pilot dev. DIN 40 kHz +8 % pilot dev.	Stereo L-channel (1,000 Hz)	VTVM to L-channel output (J301 L-channel)	98.0 MHz (P2)	Front end IFT for minimum distortion.
2		Stereo R-channel (1,000 Hz)	VTVM to R-channel output (J301 R-channel)		

2) IF BAND switch at "NARROW" position

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Digital Readout Frequency Setting	Adjust
1	FM signal generator 500 μV output modulated by MPX signal generator to FM antenna terminal (75-ohm). Modulation level: IHF 67.5 kHz +9 % pilot dev. DIN 40 kHz +8 % pilot dev.	Stereo L-channel (1,000 Hz)	VTVM to R-channel output (J301 R-channel)	98.0 MHz (P2)	L201 for minimum distortion.
2		Stereo R-channel (1,000 Hz)	VTVM to L-channel output (J301 L-channel)		

• Muting Level Alignment

(Function switch at "FM" position and MODE switch at "AUTO STEREO" position)

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Digital Readout Frequency Setting	Adjust
1	FM signal generator 6.3 μV output to FM antenna terminal (75-ohm)	98.0 MHz	AC VTVM to L- or R-channel output (J301)	98.0 MHz (P2)	IF BAND WIDE R325/NARROW R218 to a point at which output appears.

• Multiplex Alignment

(Function switch at "FM" position and MODE switch at "AUTO STEREO" position)

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Digital Readout Frequency Setting	Adjust
1	FM signal generator 500 μV output modulated by MPX signal generator to FM antenna terminal (75-ohm) Modulation level: IHF 67.5 kHz +9 % pilot dev. DIN 40 kHz +8 % pilot dev.	Stereo L-channel (1,000 Hz)	VTVM to R-channel output (J301 R-channel)	98.0 MHz (P2)	IF BAND WIDE R303/NARROW R304 so that channel separation is identical between both channels.
2		Stereo R-channel (1,000 Hz)	VTVM to L-channel output (J301 L-channel)		
3	Repeat steps 1 and 2.				
4	RF generator to FM antenna terminal (75-ohm) with 500 μV FM stereo signal	Pilot only	VTVM to R- and L-channel outputs (J301)	—	R302 so that minimum output is identical between both channel.

8-2. AM/LW Alignment Procedures

(Function switch at "AM" position)

• AM IF Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Digital Readout Frequency Setting	Adjust
1	Sweep generator to AM antenna terminal	450 kHz	AC VTVM to L- or R-channel output (J301)	—	FA01 for maximum and symmetrical waveform.

• AM RF Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Digital Readout Frequency Setting	Adjust
1	AM signal generator to AM loop antenna in a test loop	603 kHz	VTVM to L- or R-channel output (J301)	603 kHz (P4)	LA01 for maximum output.
2		1,404 kHz		1,404 kHz (P6)	CA01 for maximum output.
3	Repeat steps 1 and 2 until sensitivity is maximized.				

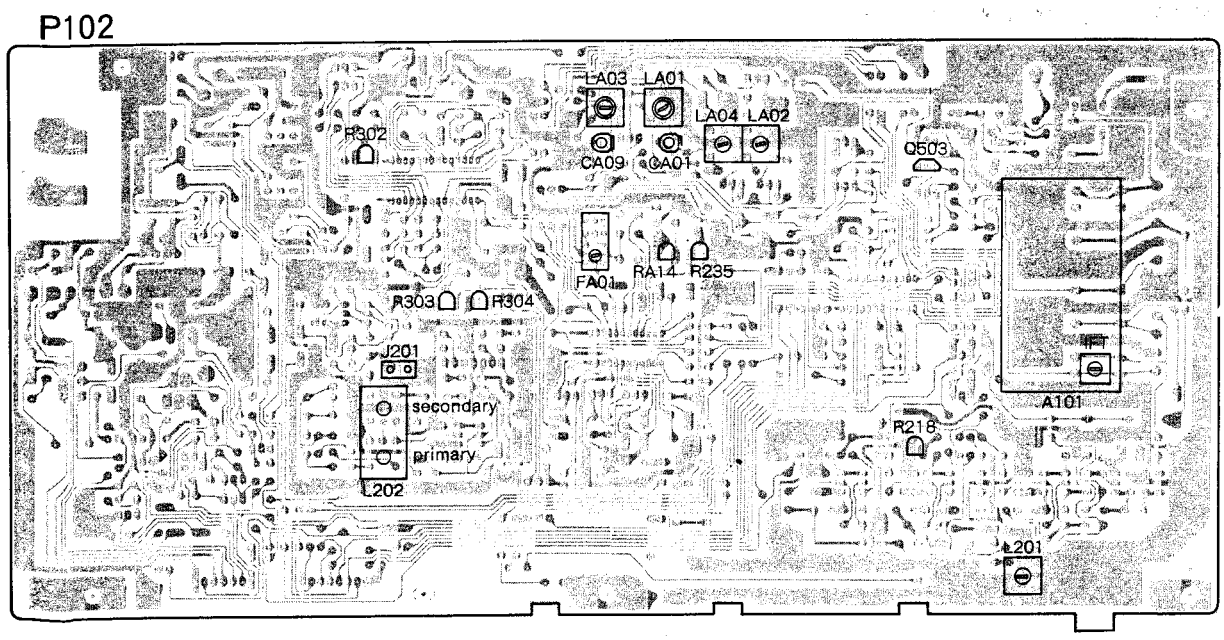
• LW RF Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Digital Readout Frequency Setting	Adjust
1	AM signal generator to AM loop antenna in a test loop	173 kHz	VTVM to L- or R-channel output (J301)	173 kHz (P7)	LA03 for maximum output.
2		272 kHz		272 kHz (P9)	CA09 for maximum output.
3	Repeat steps 1 and 2 until sensitivity is maximized.				

• AM Auto Stop Alignment (Function switch at "AM" position)

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Digital Readout Frequency Setting	Adjust
1	RF generator to AM loop antenna in a test loop (500 μV/m)	999 kHz	—	999 kHz (P5)	RA14 so that the first unit of the signal indicator on the display tube lights.

9. ALIGNMENT POINTS AND TEST POINTS



10. TUNER MICROPROCESSOR SPECIFICATIONS

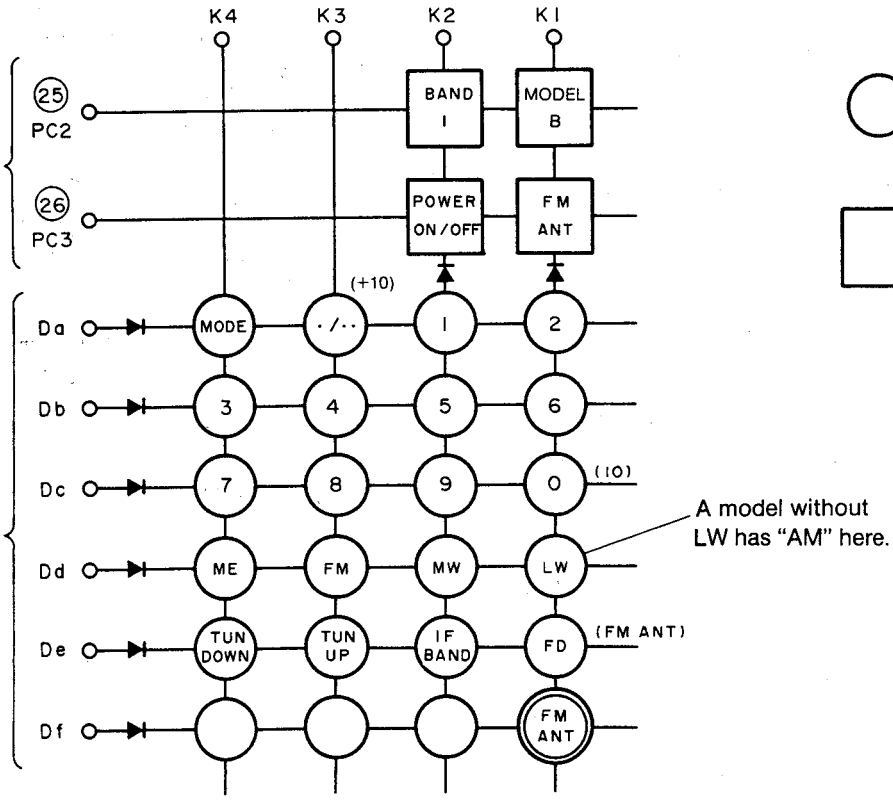
10-1. Receiving Frequency Range, Channel Space, Reference Frequency and Intermediate Frequency

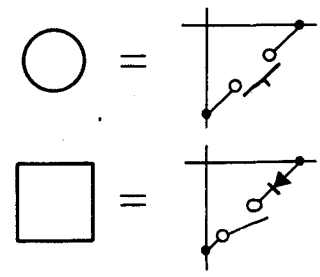
		Receiving Frequency	Channel Space	Reference Frequency	Intermediate Frequency
Japan	FM	76.0~90 MHz	100 kHz	25 kHz	−10.7 MHz
	AM	531~1602 kHz	9 kHz	9kHz	+450 kHz
U.S.A.	FM	87.5~108.0 MHz	100 kHz	25 kHz	+10.7 MHz
	AM	520~1710 kHz	10 kHz	10 kHz	+450 kHz
Europe	FM	87.50~108.00 MHz	50 kHz	25 kHz	+10.7 MHz
	MW	531~1602 kHz	9 kHz	9 kHz	+450 kHz
	LW	152~282 kHz	1 kHz	1 kHz	+450 kHz

10-2. Tuning Function

1) Automatic Up/Down Tuning (sawtooth wave mode)
2) Manual Up/Down Tuning
   The tuning frequency varies steppedly when the momentary switch is pressed or rapidly at a rate of approximately 70 msec/step when the same switch is pressed continuously for more than 0.5 sec. In this situation, if the said switch is released from hand pressure, automatic tuning is performed.
3) Preset Memory Call
   a. Random access to 24 FM and AM (MW+LW) stations (Except for model A for Japan)
      Call by a numeral key + the single/double (./..) digit key + a numeral key where necessary
   b. Random access to 20 FM and AM stations (only for models for Japan)
      Call by a numeral key + (+10 key where necessary).

Key Matrix





( )内は JAPAN 仕向のみ

10-3. Description of Keys

(0)~(9): Numeral keys

Preset memory writing, call and direct access call

(FM) (MW) (LW): Band selection keys

With a model without LW, the "LW" key falls invalid.

(MODE): Mono/stereo output selection key

At FM, when this key is pressed, OUT1 of PLL IC LC7218 varies between "LOW" and "HIGH" cyclically. In synchronization with this variation, "AUTO" in the FL display flickers.

(TUN UP) (TUN DOWN): Tuning up/down keys

The tuning frequency increases or decreases by 1 step at each pressure (for less than 0.5 second), and varies rapidly at a rate of approximately 70 msec/step when either is pressed continuously for 0.5 second or more. In this situation, when that key is released from hand pressure, auto tuning is performed.

(ME): Memory writing key

When the key is pressed, "MEMORY" flickers (at 1 Hz) for approximately 5 seconds, thus indicating that the memory is capable of writing. The wanted number is input by means of a numeral key, the single/double (./..) digit key and a numeral key where necessary, in which way at the point of time when a digit of units order is input, the frequency then being received is memorized.

(IF BAND): FM IF WIDE/NARROW selection key

At FM, when this key is pressed, the OUT3 signal of PLL IC LC7218 varies between "LOW" and "HIGH" in a cyclic manner.

(·/··): Single/double digit key (except for models for Japan)

This key is used in calling one of preset station numbers P10 to P30. When the key is pressed, " PRESET " is displayed, the LED segment g of units order digits lights and that of tens order digit flickers.

Flickers (for 5 seconds at 1 Hz)

(·/··): Single/double digit key (only for models for Japan)

This key is used in calling one of preset station numbers P10-P20. When the key is pressed, " PRESET " is displayed, and the LED segment g of units order digit flickers.

Flickers (for 5 seconds at 1 Hz)

(FM ANT): Antenna A/B selection key (only for models for Japan)

At FM, when this key is pressed, OUT6 of PLL IC LC7218 varies between "LOW" and "HIGH" in a cyclic manner. In synchronization with this variation, "ANT A.B" on the FL display flickers.

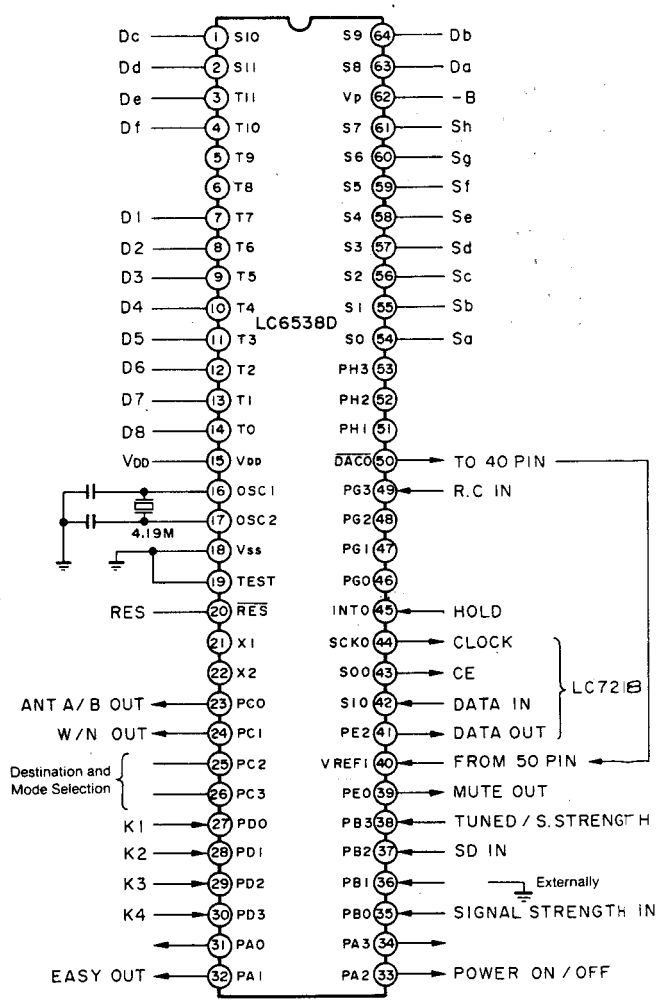
(FD): Frequency direct access tuning key (except for models for Japan)

When this key is pressed, the direct access tuning mode is entered whether in FM or in AM.

(FM ANT): Same operation with (FM ANT) irrespective of any model whatever its destination.

* This key depends on the initial diode setting.

Pin Connections



Pin Functions

PU: Output with pull-up MOS
OD: Open-drain output

Symbol	No. of pin(s)	I/O	Function	Output driver	Option	When resetting
V_{DD}	1	—	Power supply pin	—	—	—
V_{SS}	1	—				
TEST	1	I	LSI test pin, which should necessarily be connected Vss for use.	—	—	—
$\overline{RES}$	1	I	System reset input. Initial reset at $\overline{RES}$="LOW"	—	—	—
OSC1	1	I	Pins to constitute the main system clock oscillation circuit. External clock is input to OSC1 with OSC2 opened. With built-in feedback resistor.	—	—	—
OSC2	1	O				
X1	1	I	Pins to constitute the sub clock oscillation circuit. External clock is input to X1 with X2 opened. With built-in feedback resistor and damping resistor	—	—	—
X2	1	O				
T0~T11	12	O	FL display tube digit exclusive output. Display RAM fixed address output for static mode.	P-ch high withstand voltage and large current type	Pull-down resistor existence/non-existence (bit-wise)	L
S8 ~S11	4	O	FL display tube digit/segment output. Display RAM fixed address output for static mode.	P-ch high withstand voltage and large current type	Pull-down resistor existence/non-existence (bit-wise)	L
S0~S7	8	O	FL display tube segment exclusive output. Display RAM fixed address output for static mode.	P-ch high withstand voltage and large current type	Pull-down resistor existence/non-existence (bit-wise)	L
V_P	1	—	FL display tube output pull-down resistor load power input.	—	—	—
PA_0~PA_3	4	I/O	I/O in units of bit or unit of 4 bits Input of key scan low-threshold type with a function to automatically read the key scan data into RAM.	+15 V withstand voltage and medium current type	PU or OD for each bit	H
PB_0~PB_3	4	I	Built-in comparator of 4 independent channels. Reference voltage selectable between external and internal. Input in units of bit or unit of 4 bits. At low-speed mode (1/32 mode, sub clock mode), input function is stopped.	—	—	Input function stopped
PC_0~PC_3	4	I/O	I/O in units of bit or unit of 4 bits	+15 V withstand voltage and large current type	• PU or OD for each bit • Output when resetting	H/L (option)
PD_0~PD_3	4	I/O	I/O in units of bit or unit of 4 bits	+15 V withstand voltage and large current type	• PU or OD for each bit • Output when resetting	H/L (option)
PE_0~PE_2	4	I/O	I/O in units of bit or unit of 3 bits PE_0/V_{REF0} Used with external reference input of PB1-PB3 PE_1/V_{REF1} Used with external reference input of PB0 PE_2/START Used with HALT control START	+15 V withstand voltage and medium current type only of PE2. Normal withstand voltage and medium current type of others.	PU or OD for each bit	H
PF_0~PF_3	4	I/O	I/O in units of bit or unit of 4 bits PF_0/SI0 Used with serial input S10 PF_1/SO0 Used with serial output SO0 PF_2/SCK0 Used with serial clock I/O SCK0 PF_3/INT0 Used with INT0 interrupt input	+15 V withstand voltage and medium current type	PU or OD for each bit	H
PG_0~PG_3	4	I/O	I/O in units of bit or unit of 4 bits PG_0/SI_1 Used with serial input SI1 PG_1/SO1 Used with serial output SO1 $PG_2/\overline{SCK1}$ Used with serial clock I/O $\overline{SCK1}$ $PG_3/\overline{INT1}$ Used with $\overline{INT1}$ interrupt input	+15 V withstand voltage and medium current type	PU or OD for each bit	H
PH_0~PH_3	4	I/O	I/O in units of bit or unit of 4 bits $PH_0/\overline{DAC0}$ Used with 6-bit PWM D/A output $PH_1/\overline{DAC1}$ Used with 8/14-bit PWM D/A output PH_2/SQR Used with square wave pulse output PH_3/HCNT Used with horizontal sync detection input	+15 V withstand voltage and medium current type	PU or OD for each bit	H

10-4. Pin Description

Sa~Sh: Fluorescent display segment signals

D_1~D_8: Fluorescent display digit signals and key return signals

D_a~D_f: Key return signals

K_1~K_4: Key input, diode matrix input

CLOCK, CE, DATA IN, DATA OUT: Signals transferred to PLL IC LC7218

SD IN: Station detector signal input
When the SD IN pin becomes "LOW" as regards a frequency band, the STRQ pin (LC7218 OUT2) becomes "HIGH" so that PLL IC performs IF counting. As a result of this, when FM 10.7 MHz ±10 kHz, MW 450 kHz ±3 kHz or LW 450 kHz ±0.6 kHz is obtained, "TUNED" lights, while when in the auto tuning mode, the station scanning stops.

S.STRENGTH IN: FM/AM signal strength input
The DC voltage from the tuner is input to make the 5-dot segment signal strength indicator light.

MUTE OUT: Audio mute output (active "LOW")
Exactly the same output as OUT0 of PLL IC LC7218

W/N OUT: WIDE/NARROW indicator output
Exactly the same output as OUT3 of PLL IC LC7218

ANT A/B OUT: Antenna A/B indicator output (only for models for Japan)
Exactly the same output as OUT6 of PLL IC LC7218

TUNED/SIGNAL STRENGTH: Determines the fluorescent display ON/OFF.
* When this pin is at "0", "TUNED" (D8-Sh) is not lit independent of the "LOW"/"HIGH" state of SD.
* When this pin is at "1", D8 and Sa-Sf are not lit independent of the "LOW"/"HIGH" state of SD or the DC input of SIGNAL STRENGTH IN.

Due to the "LOW"/"HIGH" operation of this pin, some models have the fluorescent display ON/OFF determined.
"0" (LOW): Signal strength indicator lights.
"1" (HIGH): "TUNED" lights.

■
- Sa~Sh
- D1-D8
- FM MONO, W/N OUT, ANT A/B OUT, POWER On/OFF OUT

Any above pin becomes "HIGH" from "LOW" after holding and starts output 0.5 second after.

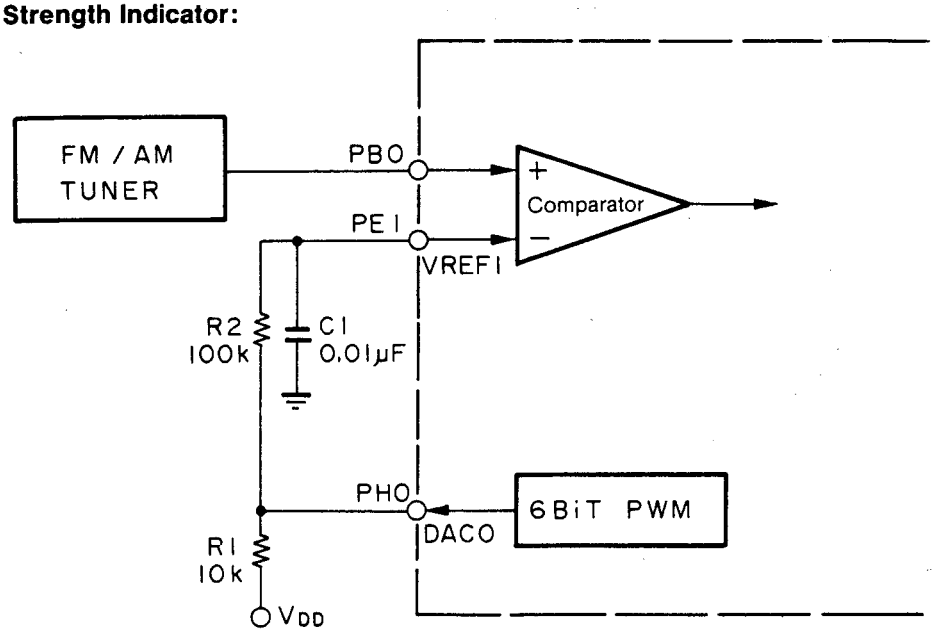
BAND 1: **Destination selection initial setting diode**
[combined with port 8 of PLL IC LC7218 (Q501)]

	USA	JAPAN	EUROPE without LW	EUROPE with LW
BAND 1	1	0	1	0
IN 1 (PLL IC)	1	1	0	0

BAND 1
1: With diode (DS09)
0: Without diode

IN 1
1: "HIGH", 0: "LOW"

10-5. 5-dot Signal Strength Indicator:



		SIGNAL STRENGTH INPUT VOLTAGE VBO (DC.V)				
		DOT 1 (Sb)	DOT 2 (Sc)	DOT 3 (Sd)	DOT 4 (Se)	DOT 5 (Sf)
FM	ON	*	1.3	1.7	2.1	≧2.5
	OFF		1.25	1.65	2.05	≦2.45
AM	ON	*	1.3	1.7	2.1	≧2.5
	OFF		1.25	1.65	2.05	≦2.45

LC7218 Port Assignment:
- OUT0: $\overline{MUT}$, mute output
- OUT1: FM MONO output
- OUT2: STRQ output
- OUT3: W/N output, FM WIDE/NARROW
- OUT4: $\overline{FM}$, FM band selection
- OUT5: $\overline{AM}$, AM (MW) band selection
- OUT6: $\overline{LW}$, LW band selection/FM ANT A.B

	OUT 0 PIN ⑨	OUT 1 PIN ⑩	OUT 2 PIN ⑪	OUT 3 PIN ⑫	OUT 4 PIN ⑬	OUT 5 PIN ⑭	OUT 6 PIN ⑰	
	MUT OUT	FM MONO	STRQ	W/N OUT	$\overline{FM}$	$\overline{AM}$	$\overline{LW}$	FM ANT A.B
FM	1/0	1/0	1/0	1/0	0	1	1	1/0
AM (MW)		1		0	1	0	1	1/0 (Note)
LW					1	1	0	

IN 0: STEREO IN (PIN ⑦)
IN 1: Destination selection (PIN ⑧)

Note: The FM mode given just prior stays as it is.

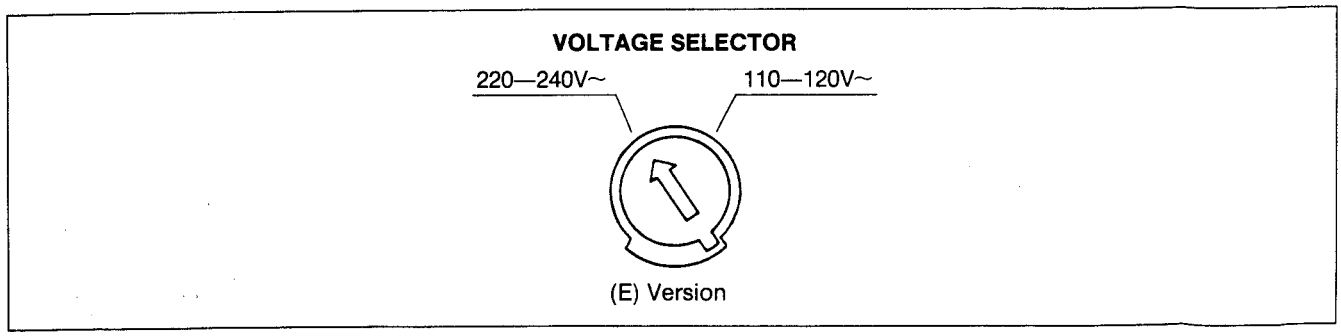
11. VOLTAGE CONVERSION

● EUROPEAN MODEL ONLY

To convert the unit to a different power source voltage, change the position as illustrated in the drawing below.

CAUTION
DISCONNECT POWER SUPPLY CORD FROM AC OUTLET BEFORE CONCVERTING VOLTAGE.

Voltage Conversion Chart



(E) Version

12. ELECTRICAL PARTS LIST

ASSIGNMENT OF COMMON PARTS CODES.

RESISTOR

R***: (1) GD05---140, Carbon film fixed resistor, ±5%, 1/4W
R***: (2) GD05---160, Carbon film fixed resistor, ±5%, 1/6W

① — Resistance value

Examples

① Resistance value

0.1Ω...001	10Ω...100	1kΩ...102	100kΩ...104
0.5Ω...005	18Ω...180	2.7kΩ...272	680kΩ...684
1Ω...010	100Ω...101	10kΩ...103	1MkΩ...105
6.8Ω...068	390Ω...391	22kΩ...223	4.7MkΩ...475

(Note) Please distinguish 1/4W from 1/6W by the shape of parts used actually.

C***: CERAMIC CAP.

(1) DD1---370, Ceramic condenser
Disc type
①② Temp. coeff. P350 ~ N1000, 50V

②—Capacity value
①—Tolerance

Examples

① Tolerance (Capacity deviation)
±0.25pF...0
±0.5pF...1
±5%...5

* Tolerance of COMMON PARTS handled here are as follows:
0.5pF ~ 5pF...±0.25pF
6pF ~ 10pF...±0.5pF
12pF ~ 560pF...±5%

② Capacity value

0.5pF...005	3pF...030	100pF...101
1pF...010	10pF...100	220pF...221
1.5pF...015	47pF...470	560pF...561

C***: CERAMIC CAP.

(1) DK16---300, High dielectric constant ceramic condenser
Disc type
① Temp. chara. 2B4, 50V

Capacity value

Example

② Capacity value

100pF...101	1000pF...102
470pF...471	2200pF...222
	10000pF...103

C***: ELECTROLY CAP. (⧧), FILM CAP. (⧦)

(1) EA-----10, Electrolytic condenser
One-way lead type, Tolerance ±20%
①②

②—Dielectric strength
①—Capacity value

Examples

① Capacity value

0.1μF...104	4.7μF...475	100μF...107
0.33μF...334	10μF...106	330μF...337
1μF...105	22μF...226	1100μF...108
		2200μF...228

② Working voltage

6.3V...006	25V...025
10V...010	35V...035
16V...016	50V...050

(2) DF15---350, Plastic film condenser
One-way type, Mylar ±5% 50V
①

Capacity value

Examples

① Capacity value

0.001μF (1000pF)...102	0.1μF...104
0.0018μF.....182	0.56μF...564
0.01μF.....103	1μF...105
0.015μF.....153	

REF. DESIG.	PART NO.	DESCRIPTION
		P102-TUNER CIRCUIT BOARD
		P102-CAPACITORS
CA01	4822 125 50384	Trimming 20pF
CA02	4822 122 40306	Ceramic 0.047μF +80% −20%
CA03	4822 126 10512	Ceramic 15pF ±5%
CA04	4822 121 41629	Film 390pF ±5%
CA05	4822 126 10513	Ceramic 47pF ±5%
CA06	4822 122 32486	Ceramic 0.01μF +80% −20%
CA07	4822 122 32486	Ceramic 0.01μF +80% −20% [T, W]
CA08	4822 126 10362	Ceramic 22pF ±5% [T, W]
CA09	4822 125 50384	Trimming 20pF [T, W]
CA10	4822 126 10363	Ceramic 68pF ±5% [T, W]
CA11	4822 122 10367	Ceramic 150pF ±5% [T, W]
CA12	4822 122 32486	Ceramic 0.01μF +80% −20% [T, W]
CA13	4822 122 32486	Ceramic 0.01μF +80% −20% [T, W]
CA14	4822 122 32486	Ceramic 0.01μF +80% −20%
CA15	4822 126 10363	Ceramic 68pF ±5%
CA16	4822 124 90354	Elect 100μF 16V
CA19	4822 124 22696	Elect 3.3μF 50V
CA20	4822 122 32486	Ceramic 0.01μF +80% −20%
CA21	4822 122 32486	Ceramic 0.01μF +80% −20%
CA22	4822 122 32486	Ceramic 0.01μF +80% −20% [A, E, N]
	4822 122 40306	Ceramic 0.047μF +80% −20% [T, W]
CA23	4822 122 32486	Ceramic 0.01μF +80% −20%
C102	4822 122 32486	Ceramic 0.01μF +80% −20%
C103	4822 122 32486	Ceramic 0.01μF +80% −20%
C104	4822 122 32486	Ceramic 0.01μF +80% −20%
C105	4822 122 32486	Ceramic 0.01μF +80% −20%
C201 ~ C206	4822 122 32486	Ceramic 0.01μF +80% −20%
C207	4822 126 10362	Ceramic 22pF ±5%
C208 ~ C213	4822 122 32486	Ceramic 0.01μF +80% −20%
C214	4822 122 40306	Ceramic 0.047μF +80% −20%
C215	4822 122 40306	Ceramic 0.047μF +80% −20%
C216	4822 124 22571	Elect 10μF 50V
C217	4822 122 40306	Ceramic 0.047μF +80% −20%
C218	4822 122 40306	Ceramic 0.047μF +80% −20%
C220	4822 126 10512	Ceramic 15pF ±5%
C222	4822 126 10363	Ceramic 68pF ±5%
C223	4822 122 40306	Ceramic 0.047μF +80% −20%
C224	4822 122 32486	Ceramic 0.01μF +80% −20%
C225	4822 122 32486	Ceramic 0.01μF +80% −20%
C226	4822 122 40306	Ceramic 0.047μF +80% −20%
C227 ~ C230	4822 122 32486	Ceramic 0.01μF +80% −20%
C231	4822 124 22571	Elect 10μF 50V
C232	4822 122 10408	Ceramic 220pF ±10%
C233	4822 122 10408	Ceramic 220pF ±10%
C234	4822 126 10364	Ceramic 100pF ±10%
C235	4822 124 22571	Elect 10μF 50V
C236	4822 124 90358	Elect 22μF 16V
C237	4822 124 90354	Elect 100μF 16V
C238	4822 122 32486	Ceramic 0.01μF +80% −20%
C239	4822 124 22571	Elect 10μF 50V
C240	4822 124 22571	Elect 10μF 50V

U=FT50 only

REF. DESIG.	PART NO.	DESCRIPTION
C241	4822 122 32486	Ceramic 0.01μF +80% −20%
C242	4822 122 32486	Ceramic 0.01μF +80% −20%
C243	4822 122 32486	Ceramic 0.01μF +80% −20%
C245	4822 122 32486	Ceramic 0.01μF +80% −20%
C246	4822 122 32486	Ceramic 0.01μF +80% −20%
C247	4822 122 32486	Ceramic 0.01μF +80% −20%
C301	4822 126 10364	Ceramic 100pF ±10%
C309	4822 126 10408	Ceramic 220pF ±10%
C309		Ceramic, 330PF ±10% [U]
C310	4822 126 10408	Ceramic 220pF ±10%
C310		Ceramic, 330PF ±10% [U]
C311	4822 124 22696	Elect 3.3μF 50V
C312	4822 124 22696	Elect 3.3μF 50V
C313	4822 126 10408	Ceramic 220pF ±10%
C314	4822 124 90354	Elect 100μF 16V
C315	4822 124 90354	Elect 100μF 16V
C317	4822 126 10364	Ceramic 100pF ±10% [E]
C318	4822 126 10364	Ceramic 100pF ±10% [E]
C501	4822 126 10513	Ceramic 47pF ±5%
C502	4822 126 10513	Ceramic 47pF ±5%
C503	4822 124 90354	Elect 100μF 16V
C504	4822 122 32486	Ceramic 0.01μF +80% −20%
C507	4822 122 32486	Ceramic 0.01μF +80% −20%
C801	4822 122 32486	Ceramic 0.01μF +80% −20%
C802	4822 122 32486	Ceramic 0.01μF +80% −20%
C803	4822 122 32486	Ceramic 0.01μF +80% −20%
C804	4822 122 32486	Ceramic 0.01μF +80% −20%
C805	4822 122 22695	Elect 2200μF 35V
C810	4822 122 22571	Elect 10μF 50V
C813	4822 122 22571	Elect 10μF 50V
C819	4822 122 22696	Elect 3.3μF 50V
		P102-RESISTORS
RA14	4822 100 11352	22KΩ, Trimming
R108	4822 116 52892	100Ω ±5% ¼W [E,T,W,U]
R218	4822 100 11386	1KΩ, Trimming
R233	4822 111 91404	150Ω ±5% 1/6W
R235	4822 100 11372	47KΩ, Trimming
R241	4822 116 52892	100Ω ±5% ¼W
R260	4822 116 52892	100Ω ±5% ¼W
R302	4822 100 11372	47KΩ, Trimming
R303	4822 100 11427	220KΩ, Trimming
R304	4822 100 11427	220KΩ, Trimming
⚠ R801	4822 115 90166	100Ω ±2% ¼W, Fuse
⚠ R802	4822 115 90166	100Ω ±2% ¼W, Fuse [N,T,W]
R803	4822 116 60331	1KΩ ±5% 1W
		P102-SEMICONDUCTORS
DA01	4822 125 50416	Varicap SVC342
DA02	4822 130 33697	Diode 1SS135 [T, W]
DA03	4822 125 50416	Varicap SVC342 [T, W]
DA04	4822 130 33697	Diode 1SS135 [T, W]
D201 ≀ D206	4822 130 33305	Diode MA165, etc.
D301	4822 130 33305	Diode MA165, etc.

U=FT50 only

REF. DESIG.	PART NO.	DESCRIPTION
⚠ D801 ≀ ⚠ D805	4822 130 32508	Diode DSF10C/RL103E
D806	4822 130 80598	Zener RD22JB (22V), etc.
D807	4822 130 32508	Diode DSF10C/RL103E
D809	4822 130 33305	Diode MA165, etc.
D810	4822 130 33305	Diode MA165, etc.
D811	4822 130 32508	Diode DSF10C/RL103E
D812	4822 130 33305	Diode MA165, etc.
⚠ D813	4822 130 32508	Diode DSF10C/RL103E
⚠ D814	4822 130 32508	Diode DSF10C/RL103E
D815	4822 130 80116	Zener RD24JB2 (24V), etc.
D816	4822 130 33305	Diode MA165, etc.
QA01	4822 130 42298	Transistor 2SC536SP(F, G), etc. [T, W]
QA02	4822 130 42298	Transistor 2SC536SP(F, G), etc. [T, W]
QA03	4822 130 42125	Transistor 2SD1302(S, T) [T, W]
QA04	4822 130 60495	Transistor 2SA1309A(Q, R) [T,W]
QA05	4822 130 60495	Transistor 2SA1309A(Q, R) [T,W]
QA06	4822 130 60495	Transistor 2SA1309A(Q, R)
Q201	4822 209 71785	IC LA1266
Q202	4822 209 61801	IC TA7061BP
Q203	4822 130 42082	Transistor 2SC1047(C)
Q204 ≀ Q209	4822 130 42298	Transistor 2SC2458(Y, GR), etc.
Q210	4822 130 42082	Transistor 2SC1047(C)
Q211	4822 130 42082	Transistor 2SC1047(C)
Q212	4822 130 42298	Transistor 2SC2458(Y, GR), etc.
Q213 ≀ Q216	4822 130 60495	Transistor 2SA1309A(Q, R)
Q217	4822 130 42298	Transistor 2SC2458(Y, GR), etc.
Q301	4822 209 73732	IC LA3450
Q302	4822 130 42121	F.E.T. 2SK30A(Y)
Q303 ≀ Q306	4822 130 42298	Transistor 2SC2458(Y, GR), etc.
Q308	4822 130 60495	Transistor 2SA1309A(Q, R)
Q501	4822 209 73435	IC LC7218
Q502	4822 130 42121	F.E.T. 2SK30A(Y)
Q503	4822 130 42298	Transistor 2SC2458(Y, GR), etc.
Q504	4822 130 42298	Transistor 2SC2458(Y, GR), etc.
Q505	4822 130 42298	Transistor 2SC2458(Y, GR), etc.
Q506	4822 130 42298	Transistor 2SC2458(Y, GR), etc. [E]
⚠ Q801	4822 209 60826	IC NJM7812FA
⚠ Q802	4822 209 70385	IC L78MR05
Q803 ≀ Q808	4822 130 42298	Transistor 2SC2458(Y, GR), etc.
		P102-MISCELLANEOUS
A101	4822 210 10271	V.H.F. Tuner, FE407-A12 [A, E, T, W, U]
A101	4822 210 10297	V.H.F. Tuner, FE407-G28 [N]
FA01	4822 242 71509	Ceramic Filter, AM IF

U=FT50 only

REF. DESIG.	PART NO.	DESCRIPTION
F201	4822 242 72345	Ceramic Filter, SFE10.7MX2-A [E,U]
	4822 242 72346	Ceramic Filter, SFE10.7MZ2-A [A, N, T, W]
F202	4822 242 71135	Ceramic Filter, SFE10.7MS3-A [E,U]
	4822 242 70911	Ceramic Filter, SFE10.7MA8-A [A, N, T, W]
F203	4822 242 70911	Ceramic Filter, SFE10.7MA8-A
F204	4822 242 72345	Ceramic Filter, SFE10.7MX2-A
F205	4822 242 72962	Discri. Seramic, CDA10.7MA18-A
J101	4822 266 30298	Terminal, FM/AM
	4822 266 30298	Terminal FM/AM [U]
J301	4822 267 30955	Terminal, Output
J501	4822 266 30274	Terminal, R.C.
LA01	4822 157 52328	Antenna Coil, AM/MW
LA02	4822 157 52716	OSC Coil, AM/MW
LA03	4822 157 52714	Antenna Coil, LW [T, W]
LA04	4822 157 52717	OSC Coil, LW [T, W]
LA05	4822 157 53589	Choke Coil, 39mH
L102	4822 157 60481	Choke Coil, 0.68mH
L201	4822 156 40893	I.F.T. Coil, FM IFT
L202	4822 157 52451	I.F.T. Coil, FM DET
L203	4822 157 60479	Choke Coil, 3.3μH
L204	4822 157 61831	M.P.X. Coil, 190KHz [N]
L301	4822 157 60482	M.P.X. Coil, 23.38KHz
L302	4822 157 60482	M.P.X. Coil, 23.38KHz
S301	4822 277 20968	Slide Switch, Scan/Step [E]
S801	4822 276 11682	Push Switch, Power/Standby
X301	4822 242 71511	Ceramic Viblator, CSB465F11
X501	4822 242 72333	Crystal, 7.2MHz
		PS02-U-COM/TACT SWITCH CIRCUIT BOARD
		PS02-CAPACITORS
CS01	4822 122 23128	Elect 0.047μF 5.5V
CS02	4822 122 32486	Ceramic 0.01μF +80% −20%
CS03	4822 124 90354	Elect 100μF 16V
CS04	4822 122 32486	Ceramic 0.01μF +80% −20%
CS05	4822 124 22571	Elect 10μF 50V
GS02	4822 126 10452	Component 100pFx8
GS03	4822 126 10452	Component 100pFx8
		PS02-RESISTORS
GS01	4822 111 91837	Component 100KΩx4 ±5% 1/6W
		PS02-SEMICONDUCTORS
DS01	4822 130 33305	Diode 1SS133, etc. [A, E, U]
	4822 130 80839	Diode S5688G [N, T, W]
DS02	4822 130 33305	Diode 1SS133, etc.
DS03	4822 130 33305	Diode 1SS133, etc.
DS04	4822 130 33305	Diode 1SS133, etc.
DS06	4822 130 33305	Diode 1SS133, etc.
DS07	4822 130 33305	Diode 1SS133, etc.
DS08	4822 130 80326	L.E.D. LT3D8B
DS09	4822 130 33305	Diode 1SS133, etc. [A,E,N,U]
DS10	4822 130 80273	Zener RD8.2JB2, etc. [N, T, W]
QS01	4822 209 61794	Microprocessor LC6538D-4177
QS02	4822 130 42298	Transistor 2SC2458(Y, GR), etc.
		U=FT50 only

REF. DESIG.	PART NO.	DESCRIPTION
		PS02-MISCELLANEOUS
SS01 ~ SS14	4822 276 12455	Push Switch
SS15	4822 276 12455	Push Switch [T, W]
SS16 ~ SS20	4822 276 12455	Push Switch
VS01	4822 130 90751	Display Unit, FIP8CAM8
XS01	4822 242 72194	Ceramic Viblator, 4.19MHz
		U=FT50 only

NOTE ON SAFETY:
Symbol ⚠. Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol ⚠. Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

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Using superior design and selected high grade components, MARANTZ company has created the ultimate in stereo sound.
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5600 MD Eindhoven
The Netherlands
Phone: +31/40.758290
Telefax: +31/40.75.82.99
Telex: 35000 PHTC NL routing IND NLMTFAT

ORDERING PARTS:

Parts can be ordered either by mail or by telex. In both cases, correct part number has to be specified.
The following information must be supplied to eliminate delays in processing your order:

1. Complete address
2. Complete part numbers and quantities required
3. Description of parts
4. Model number for which part is required
5. Way of shipment
6. Signature: any order form or telex must be signed otherwise such part order will be considered as null and void.

PARTS ORDERING

Parts may be ordered at the following addresses:

AUSTRIA
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Vertriebsgesellschaft GmbH
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Telex: 132.332

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DIVISION OF PHILIPS S.A.
AV. Santa Maria, 0760
Casilla 2687
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Telex: 240.239

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SERVICE A/S
Prags Boulevard 80
Postbox 1919
DK-2300 København S
Denmark
Telex: 31201

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MARANTZ
DIVISION OF OY PHILIPS Ab
Kaivokatu 8
00100 Helsinki
Finland
Telex: 124811

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4 Rue Bernard Palissy
92600 Asnières
France
Telex: 611651

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MARANTZ GERMANY GmbH
Max-Planck-Strasse 22
6072 Dreieich 1
Germany
Telex: 529821

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Wint Hontlaan 28
3526 KV Utrecht
The Netherlands
Telex: 4748

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MARANTZ
DIVISION OF PHILIPS A/S
Sandstuveien 40
0680 Oslo 6
Norway
Telex: 72640

GREAT BRITAIN
MARANTZ AUDIO U.K. Ltd
Unit 15/16
Saxon Way Industrial Estate
Moor Lane
Harmondsworth UB7 OLW
Great Britain
Telex: 935196

GREECE
SHERTON ELECTRONICS S.A.
P.O.Box 21025
Hippocratus Street 188
Athens 11471
Greece
Telex: 216.795

JAPAN
MARANTZ JAPAN, Inc.
35-1, 7-chome, Sagamiono
Sagamihara-shi, Kanagawa
Japan

KUWAIT
AL ALAMIAH ELECTRONICS
Ussama Building
Fahd al Saleem Street
P.O.Box 23781
Safat-Kuwait
Telex: 22694

ITALY
MARANTZ ITALIANA S.P.A.
Via Chiese, 74
20126 Milano
Italy

SAUDI ARABIA
AL ALAMIAH ELECTRONICS
P.O.Box 5954
University Street
Riyadh 11432
Saudi Arabia
Telex: 401530

SOUTH AFRICA
MARANTZ
DIVISION OF PHILIPS S.A.
Main Road Martindale
P.O. Box. 58088
Newville 21114
South Africa

SPAIN
PHONO S.A.
Ignacio Iglesias 10
Badalona (Barcelona)
Spain
Telex: 59355

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MARANTZ
DIVISION OF PHILIPS
Försäljning AB
Tegeluddsvägen 1
S-115 84 Stockholm
Sweden
Telex: 14060

SWITZERLAND
DYNAVOX ELECTRONICS
Route de Villars 105
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All of the above locations are fully equipped to take care of your total service needs. Because various countries have differing configuration requirements, it is necessary that you contact the service facility in your particular country. In the event that there is no service location listed for your country, please, contact the nearest facility for the necessary assistance.

In case of difficulties, do not hesitate to contact the Technical Department at abovementioned address.

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